

## DOCUMENT RESUME

ED 158 103

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CE 017 581

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TITLE Multiple Learning Strategies Project. Small Engine Repair Service. Low Reader-Educable Mentally Impaired. [Vol. 1.]  
INSTITUTION Ingham Intermediate School District, Mason, Mich. Capital Area Career Center.  
SPONS AGENCY Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.  
BUREAU NO 498AH60038  
PUB DATE Jan 78  
GRANT G007603808  
NOTE 434p.; For related documents see CE 017 554-583  
EDRS PRICE MF-\$0.83 HC-\$23.43 Plus Postage.  
DESCRIPTORS \*Educable Mentally Handicapped; Engines; \*Learning Activities; Learning Modules; Repair; \*Retarded Readers; Special Education; \*Trade and Industrial Education; \*Vocational Education; Young Adults  
IDENTIFIERS Small Engines

## ABSTRACT

This instructional package, one of two designed for low reader-educable mentally impaired students, focuses on the vocational area of small engine repair service. (Low readers are identified as those reading at a 3-6 grade level.) Contained in this document are forty-three learning modules organized into nine units: engine block; air cleaner; starters; fuel tank, lines, filters and pumps; carburetors; electrical; magnetic system; lubrication; and gear boxes and drive trains. Each module includes these elements: a performance objective page that describes what the student will learn, materials needed, and how performance will be evaluated; information pages including special material not incorporated into the job steps; and job step pages which detail the steps necessary to do the task. This document and CE 017 582 are one of three sets of learning modules on small engine repair. The other two sets are written in formats designed for visually impaired and regular vocational students. The modules are part of a total set which includes over 1,300 modules written for different student populations. Building maintenance, dietetic assistant, medical assistant, and graphics are the other vocational areas covered.  
(JH)

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TO:

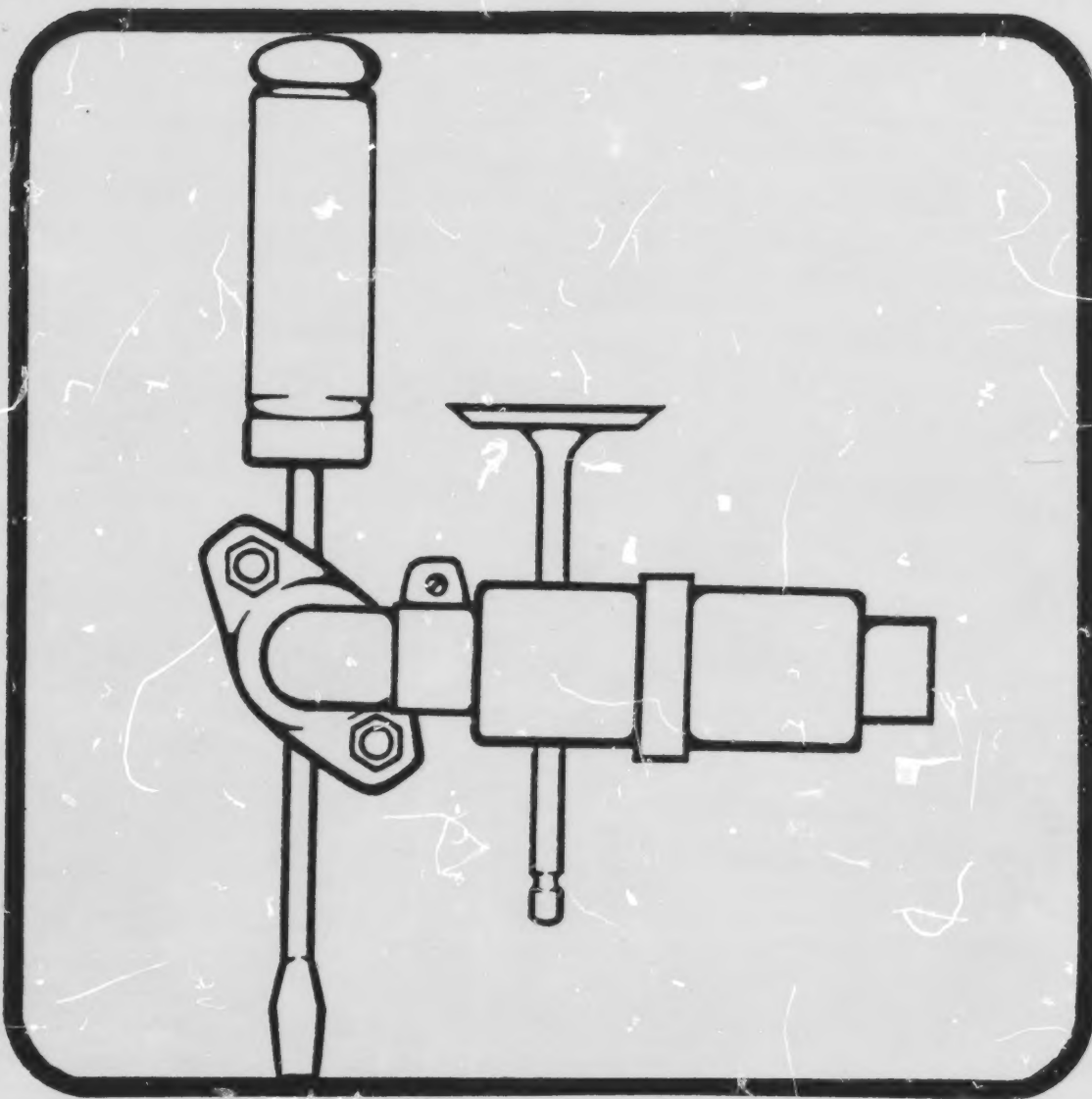
MULTIPLE LEARNING STRATEGIES PROJECT

SMALL ENGINE REPAIR SERVICE  
Low Reader-Educable Mentally Impaired

[Vol. 1]

CE 017 581





## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 001 1 7501 01 001 3 date: JANUARY 1978 level: I

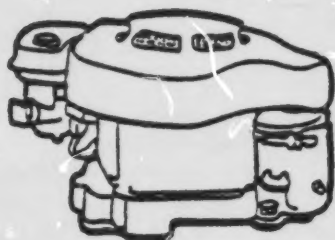
skill title: REMOVE AND REPLACE ENGINE BASE SUMP AND LOWER OIL SEAL

developed & written by: JIM PITTS AND JACK HELDER

visuals by: DAVE WEHRWEIN

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REMOVE AND REPLACE THE ENGINE BASE SUMP AND OIL SEALS  
ON A 92902 BRIGGS AND STRATTON ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:

BRIGGS AND STRATTON ENGINE  
MODEL 92902



NEW OIL SEAL



HAND TOOLS  
AND SEAL INSTALLER



TORQUE SPECIFICATION CHART



TORQUE WRENCH



WE WILL KNOW YOU CAN DO IT WHEN YOU:

1. READ THE MODULE.
2. GET YOUR EQUIPMENT.
3. REMOVE AND REPLACE THE BASE SUMP AND OIL SEAL SO THE ENGINE WILL NOT LEAK OIL WHEN RUNNING.

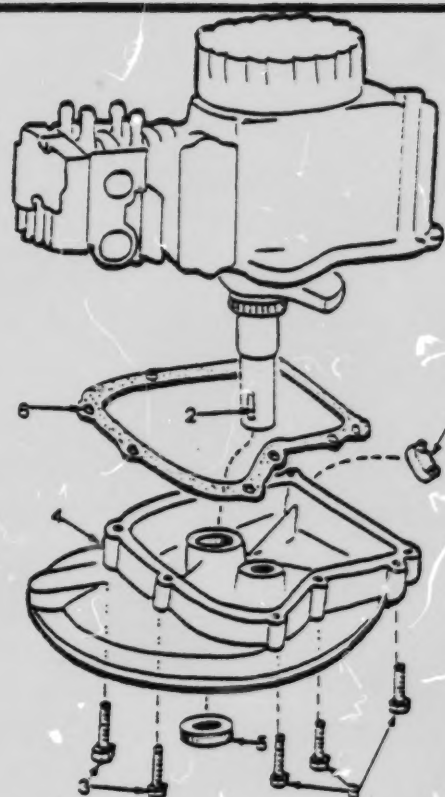
JOB STEPS

## READ:

1. LEARN THE PARTS OF A BASE  
SUMP FOR THIS 92000 SERIES  
BRIGGS AND STRATTON ENGINE.



## LOOK:



1. ENGINE OIL DRAIN
2. CRANKSHAFT AT PTO END
3. SUMP BOLTS
4. SUMP FLANGES
5. OIL SEAL
6. GASKET

CHECK: SHOW YOUR INSTRUCTOR THAT YOU KNOW ALL THE PARTS  
OF THE BRIGGS AND STRATTON 92000 SERIES ENGINE  
BASE SUMP. POINT OUT:

- 1) ENGINE OIL DRAIN
- 2) CRANKSHAFT PTO END
- 3) SUMP BOLTS
- 4) SUMP FLANGES
- 5) OIL SEAL
- 6) GASKET

JOB STEPS

READ:

LOOK:

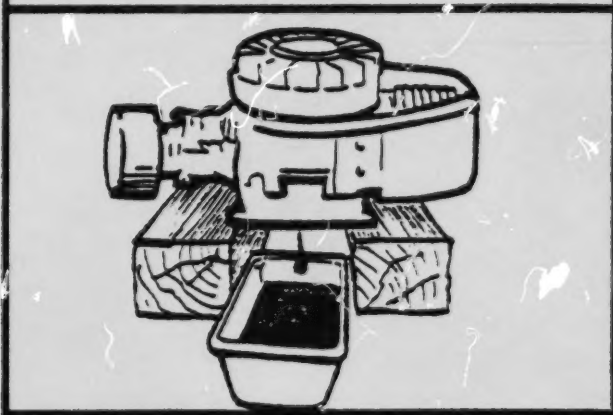
2. TAKE YOUR EQUIPMENT TO THE WORK AREA.



3. CLEAN THE OUTSIDE OF THE ENGINE. CLEAN OFF ALL LOOSE DIRT AND GREASE.



4. DRAIN ENGINE OIL.



5. DRAIN OR SHUT OFF THE GAS SUPPLY. ASK YOUR INSTRUCTOR IF YOU DON'T KNOW WHETHER TO DRAIN OR SHUT IT OFF.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL THE EQUIPMENT YOU WILL NEED.
2. CLEANED THE OUTSIDE OF THE ENGINE.
3. DRAINED ENGINE OIL.
4. DRAINED OR SHUT OFF THE GAS.



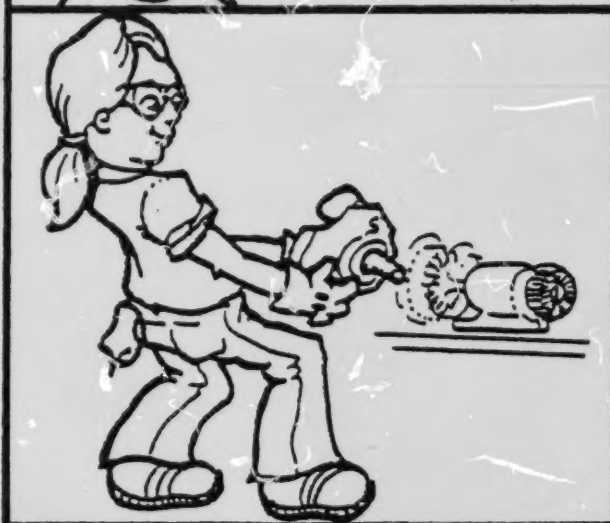
JOB STEPS

READ:

6. NOW CLEAN THE END OF THE CRANKSHAFT. USE AN OIL AND OLEUM MIXTURE AND EMORY CLOTH TO REMOVE RUST OR DIRT FROM CRANKSHAFT ENDS.



7. IF CRANKSHAFT IS VERY DIRTY OR RUSTY, USE A WIRE BUFFING WHEEL.

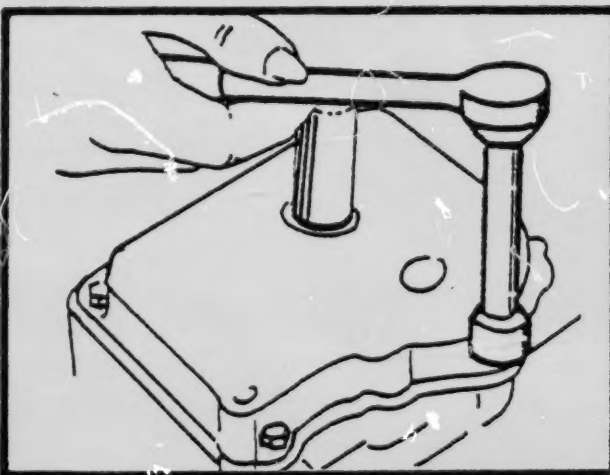


\*\*\*\*\*  
 CAUTION: HOLD THE ENGINE  
 TIGHTLY.  
 \*\*\*\*\*

NOTE: IF NOT CLEAN, THE CRANKSHAFT MAY BE SCARRED OR BIND UP WHEN TAKEN OUT.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE CLEANED THE CRANKSHAFT ENDS.

8. USING A SPEED HANDLE AND SOCKET, TAKE OUT THE PUMP BOLTS.



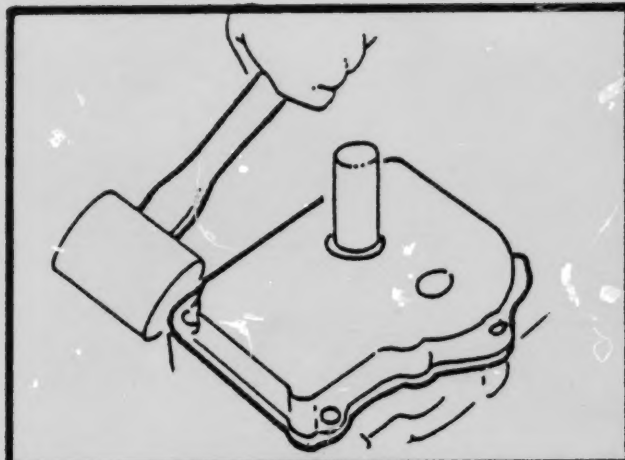
"TURN THE PAGE"

JOB STEPS

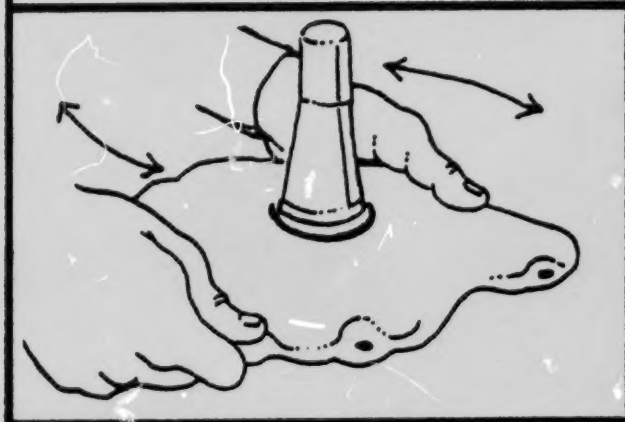
READ:

LOOK:

9. USING A BRASS, LEAD OR RUBBER Mallet, SOFTLY TAP AROUND THE SUMP FLANGES UNTIL IT COMES LOOSE.



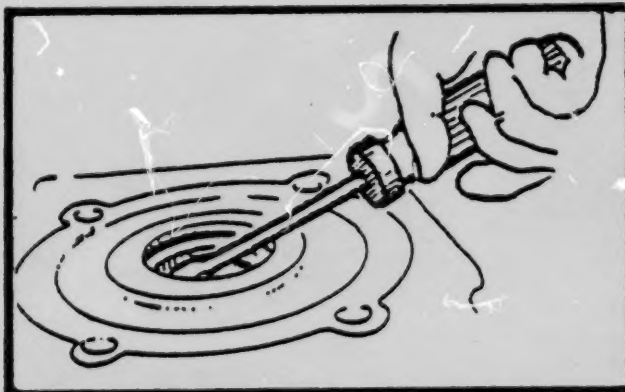
10. HOLDING THE SUMP IN BOTH HANDS, SLIDE THE SUMP OFF THE END OF THE CRANKSHAFT. IF IT DOES NOT COME OFF, CLEAN THE CRANKSHAFT END AGAIN LIKE YOU DID IN STEPS 6 AND 7.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OUT SUMP BOLTS.
2. LOOSENED THE SUMP WITH A Mallet.
3. TAKEN THE SUMP END OFF THE CRANKSHAFT.

11. PLACE A LARGE SCREWDRIVER UNDER THE SEAL EDGE AND PUSH DOWN TO POP OUT THE SEAL.



\*\*\*\*\*  
 CAUTION: DON'T PUT SCREWDRIVER  
 IN TOO FAR. THIS  
 COULD SCRATCH THE  
 BACK OF THE SEAL HOLE.  
 \*\*\*\*\*

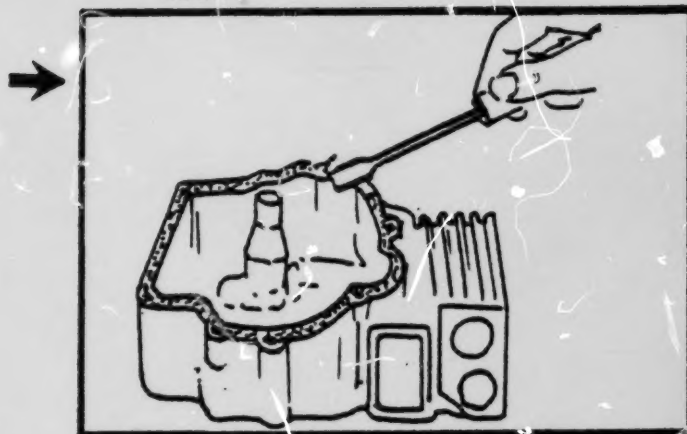
"TURN THE PAGE"

JOB STEPS

READ:

12. USING A GASKET SCRAPER,  
CLEAN THE OLD GASKET FROM  
THE BLOCK.

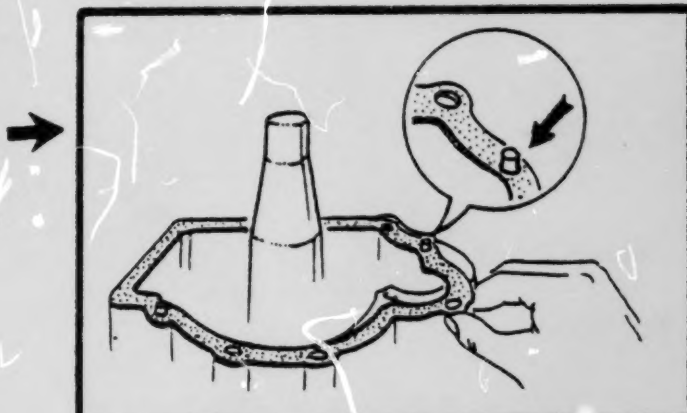
LOOK:



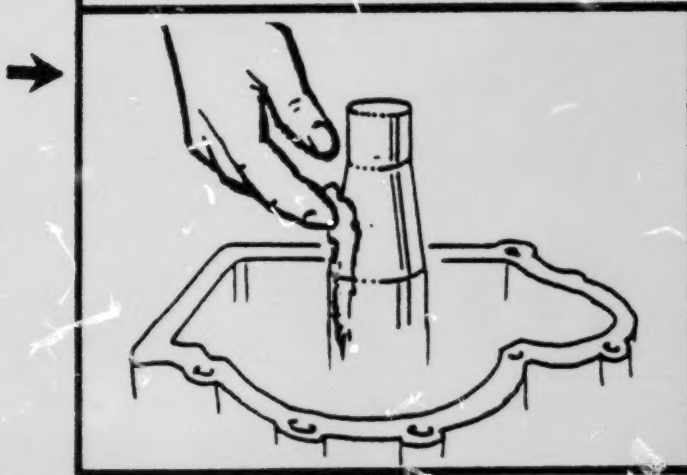
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OUT THE SEAL WITHOUT SCRATCHING  
SEAL HOLE.
2. CLEANED OLD GASKET FROM THE BLOCK.

13. PUT NEW GASKET ON BLOCK  
AND LINE UP WITH ALIGNMENT  
DOWELS.



14. PUT LUBRIPLATE GREASE ON  
CRANKSHAFT.



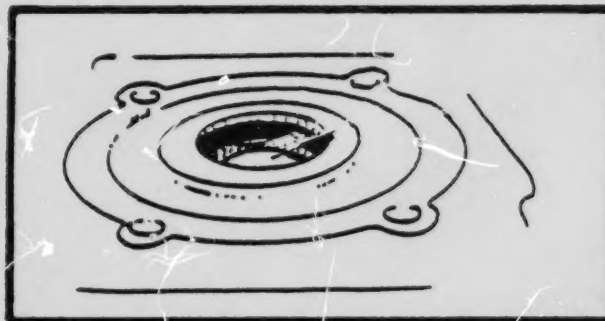
"TURN THE PAGE"

JOB STEPS

READ:

15. PUSH NEW SEAL INTO SEAL  
HOLE.

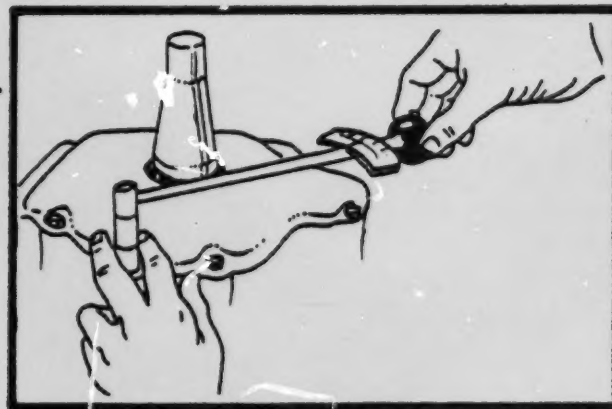
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

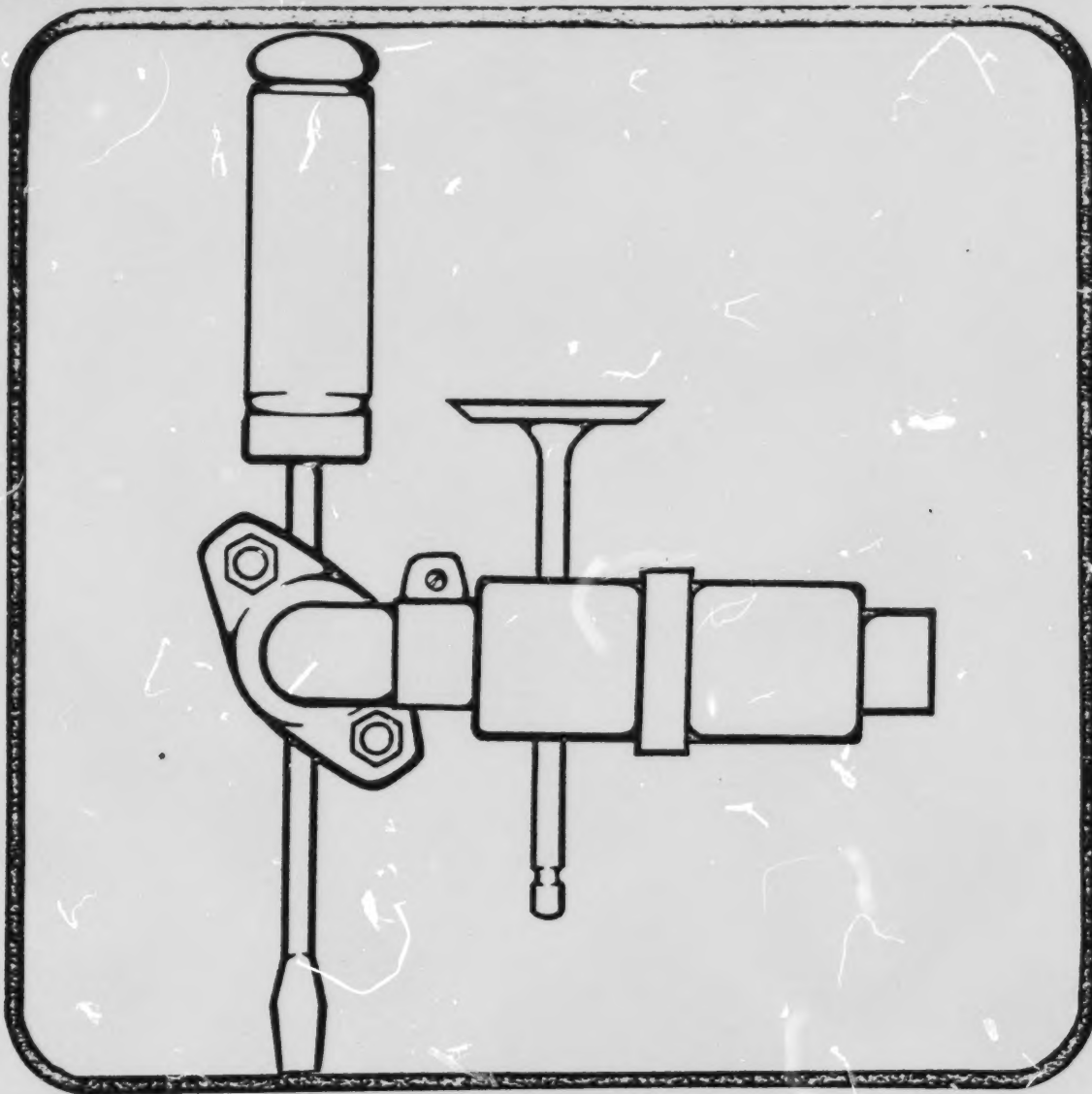
1. PUT ON NEW GASKET AND LINED UP.
2. GREASED THE CRANKSHAFT.
3. PUT IN NEW SEAL.

16. PUT ON SUMP AND  
TIGHTEN SUMP BOLTS.  
TORQUE TO SPECIFICATIONS.



CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK.





## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 002 1 7501 01 002 3 date: JUNE 1977 level:       

skill title: REMOVE AND REPLACE SUMP ON AUXILIARY P.T.O. TYPE  
BRIGGS AND STRATTON ENGINE

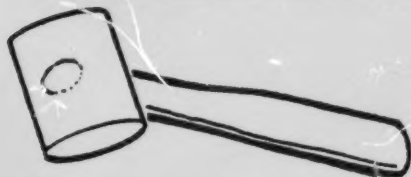
developed & written by: HARRY WRIGHT

visuals by: DAVE WEHRWEIN & BRUCE BENNETT

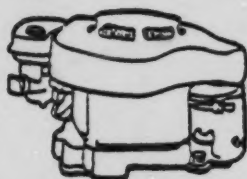
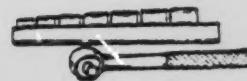
WORD GUIDESUMP - A DRAIN FOR LIQUIDSP.T.O. - POWER TAKE OFF - END OF SHAFT OR CRANK WHERE POWER GOES FROM ENGINETORQUE - A MEASURE OF A FORCESEAL - TIGHT COVERINGAUXILIARY - EXTRA P.T.O. USUALLY OUT OF THE SIDE OF THE ENGINEOLEUM - HEAVY, OILY LIQUID USED TO RINSE METAL PARTSPERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO DO THE FOLLOWING ON A BRIGGS AND STRATTON ENGINE WITH AN AUXILIARY P.T.O.:

1. TO REMOVE THE SUMP AND OIL SEAL.
2. TO REMOVE AND REPLACE THE SUMP GASKET
3. TO REMOVE THE SUMP AND OIL SEAL.

AND IN ORDER TO DO THIS YOU WILL NEED:

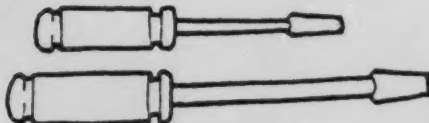
RUBBER Mallet

A BRIGGS & STRATTON  
ENGINE WITH  
AUXILIARY P.T.O.

SOCKET SET



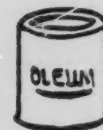
TORQUE WRENCH



SCREWDRIVER SET



OIL DRAIN PAN



OLEUM

"TURN THE PAGE"

WORD GUIDE

EMERY - MATERIAL USED FOR GRINDING  
AND POLISHING

. . . YOU WILL NEED:

A GRINDER AND/OR  
OLEUM AND EMERY  
CLOTH



SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE ALL THE CORRECT EQUIPMENT.
2. YOU HAVE CLEANED THE ENGINE AND CRANKSHAFT.
3. YOU HAVE REMOVED THE SUMP.
4. YOU HAVE REMOVED AND REPLACED THE GASKET.
5. YOU HAVE REPLACED THE SUMP SO THE ENGINE CAN START.

"TURN THE PAGE"

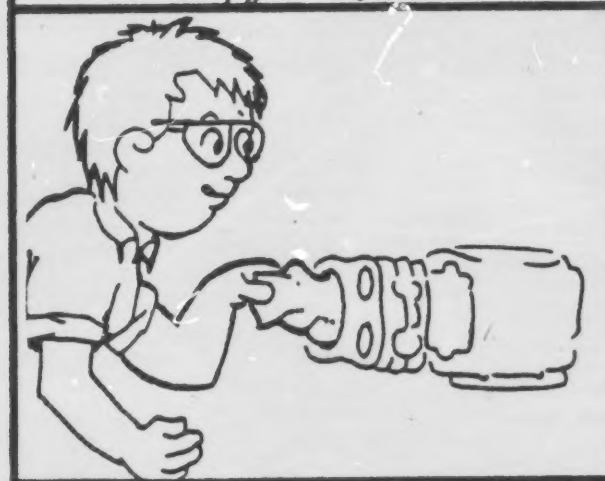
JOB STEPSREAD:

1. GET ALL EQUIPMENT AND  
TAKE IT TO YOUR WORK AREA.

2. CHECK WITH INSTRUCTOR TO  
MAKE SURE YOU HAVE CORRECT  
ENGINE.

3. PUT ON YOUR SAFETY GLASSES!

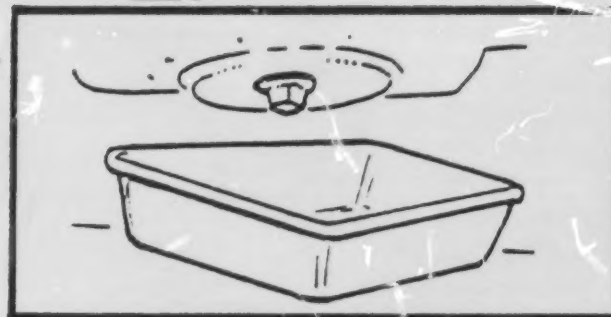
4. WITH A CLOTH AND SCREWDRIVER,  
CLEAN LOOSE DIRT AND GREASE FROM  
THE ENGINE.

LOOK:

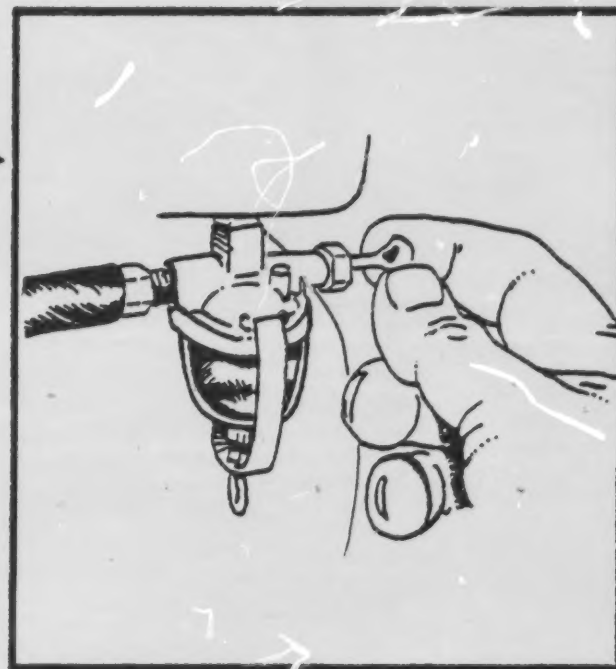


JOB STEPSREAD:

5. WITH YOUR END WRENCH, REMOVE THE OIL PLUG AT THE BOTTOM OF THE ENGINE AND DRAIN THE OIL.

LOOK:

6. FIND THE FUEL LINE SHUT-OFF VALVE AND TURN IT TO THE RIGHT.



7. THEN, MAKE SURE THE FUEL LINE IS EMPTY OF FUEL.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. PUT ON YOUR SAFETY GLASSES.
3. CLEANED LOOSE DIRT AND GREASE FROM THE ENGINE.
4. REMOVED OIL PLUG AND DRAINED OIL.
5. TURNED SHUT-OFF VALVE AND CHECKED THAT FUEL LINE IS EMPTY OF FUEL.

"TURN THE PAGE"

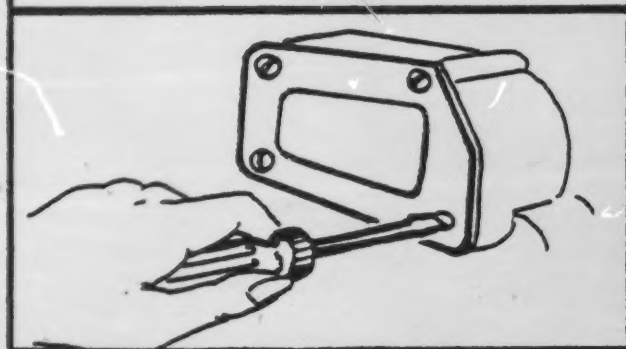
JOB STEPSREAD:

8. WITH YOUR WIRE WHEEL ON GRINDER, (OR OLEUM AND EMERY CLOTH) CLEAN THE P.T.O. END OF THE CRANKSHAFT.

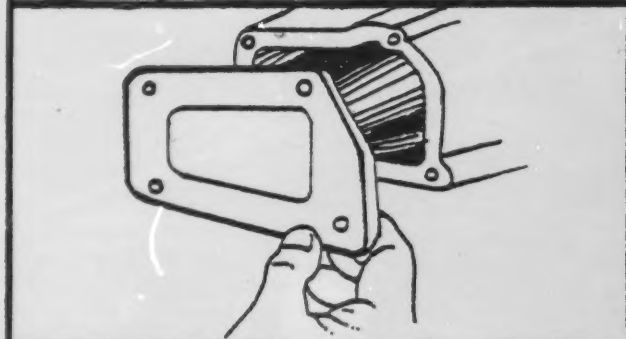
9. MAKE SURE THAT ALL OF THE CRANKSHAFT IS CLEAN.

LOOK:

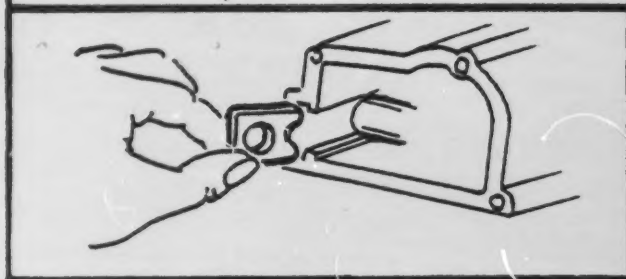
10. WITH YOUR SCREWDRIVER, REMOVE THE FOUR (4) SCREWS HOLDING THE AUXILIARY DRIVE COVER IN PLACE.



11. REMOVE THE COVER.



12. LIFT OUT THE SHAFT STOP.



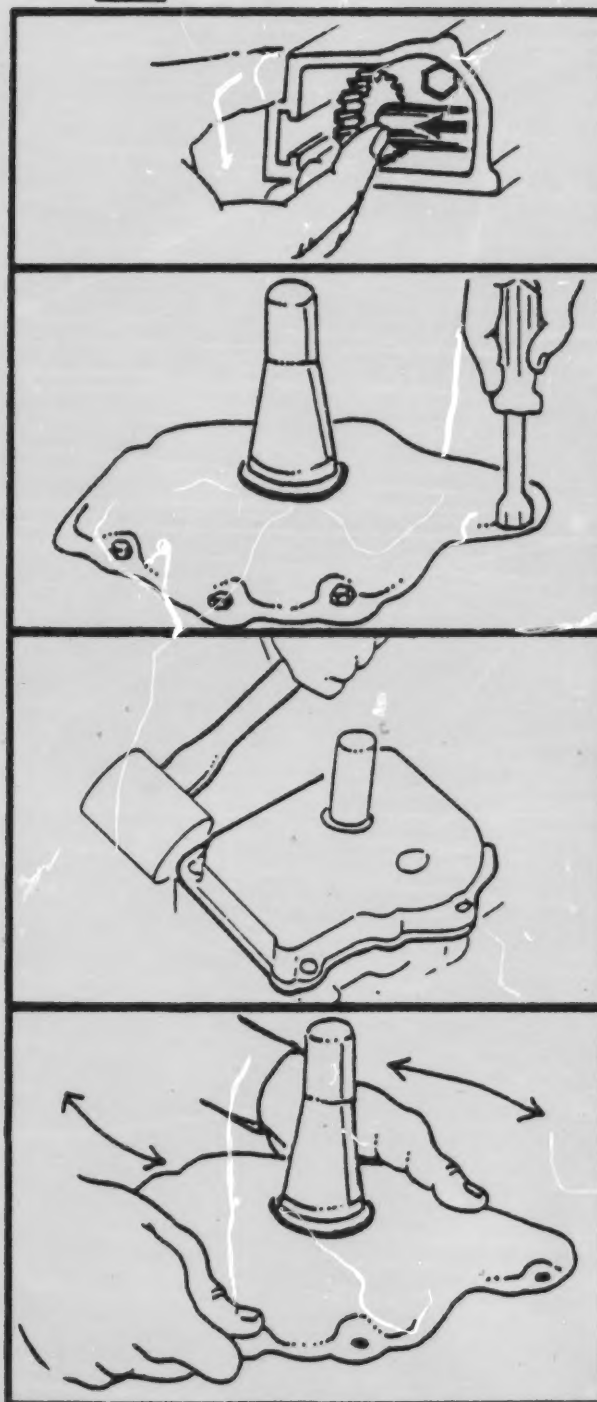
WORD GUIDEMALLET - HAMMERGENTLY - VERY EASILY, SOFTLYJOB STEPSREAD:

13. SLIDE GEAR AND SHAFT SIDeways, TO THE LEFT, SO YOU CAN SEE THE SUMP BOLT.

14. WITH YOUR SOCKET SET, REMOVE ALL THE SUMP BOLTS.

15. USING A RUBBER MALLET, HIT THE SUMP LIGHTLY IN ORDER TO LOOSEN IT.

16. TAKE HOLD OF THE SUMP WITH BOTH HANDS AND TURN IT BACK AND FORTH (GENTLY).

LOOK:

WORD GUIDE

GASKET - CORK MATERIAL USED FOR  
MAKING PARTS FIT TIGHT

JOB STEPSREAD:

17. SLIDE THE SUMP OFF THE END  
OF THE CRANKSHAFT AND PLACE IT  
UPSIDE-DOWN ON THE WORKBENCH.

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CLEANED THE P.T.O. END OF THE CRANKSHAFT.
2. REMOVED THE SUMP CORRECTLY AND PLACED  
IT UPSIDE-DOWN ON WORKBENCH.

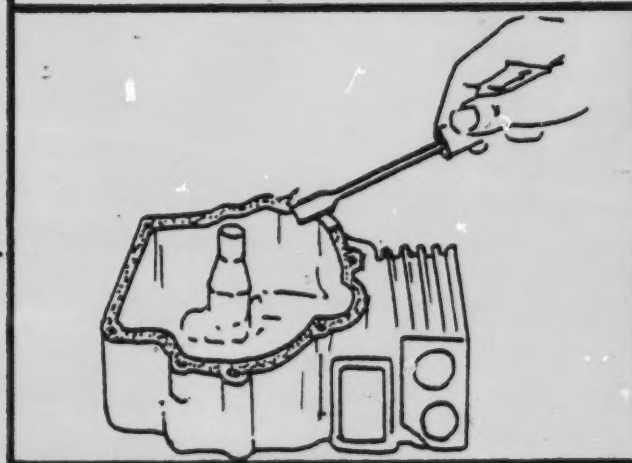
18. PUT A LARGE SCREWDRIVER UNDER  
THE EDGE OF THE SEAL. PUSH  
DOWN ON THE SCREWDRIVER HANDLE  
UNTIL SEAL POPS OUT.



NOTE: DON'T PUT THE SCREWDRIVER  
TOO FAR UNDER THE SEAL. IF YOU  
DO, IT COULD BREAK THE BACK OF  
THE SEAL HOLE, MAKING IT LEAK.



19. USING YOUR GASKET SCRAPER,  
CLEAN THE OLD GASKET FROM THE  
BLOCK.





### WORD GUIDE

DOWELS - PINS FITTING INTO A HOLE  
TO PREVENT SLIPPING

LUBRIPLATE - A LUBRICATING MATERIAL,  
A WHITE GREASE

ALIGNMENT - PUTTING INTO RIGHT  
POSITION

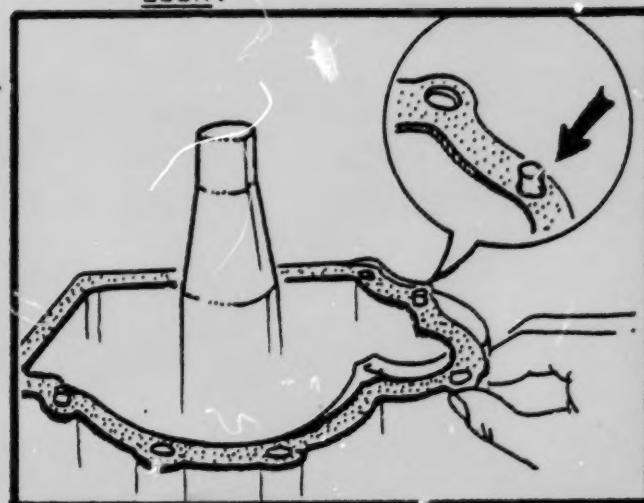
### JOB STEPS

#### READ:

20. PUT A NEW GASKET ON THE BLOCK  
AND LINE IT UP ON THE ALIGNMENT  
DOWELS.



#### LOOK:

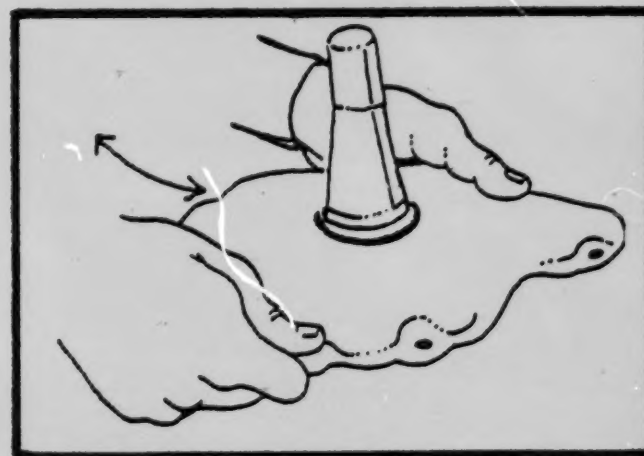


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CORRECTLY POPPED OUT THE SEAL.
2. CLEANED THE OLD GASKET WITH THE GASKET SCRAPER.
3. CORRECTLY PUT IN A NEW GASKET.

21. WITH YOUR FINGERS, PUT  
LUBRIPLATE ON THE CRANKSHAFT  
(THIS WILL LET THE SUMP SLIDE  
FREELY).

22. PUT ON THE SUMP.





WORD GUIDE

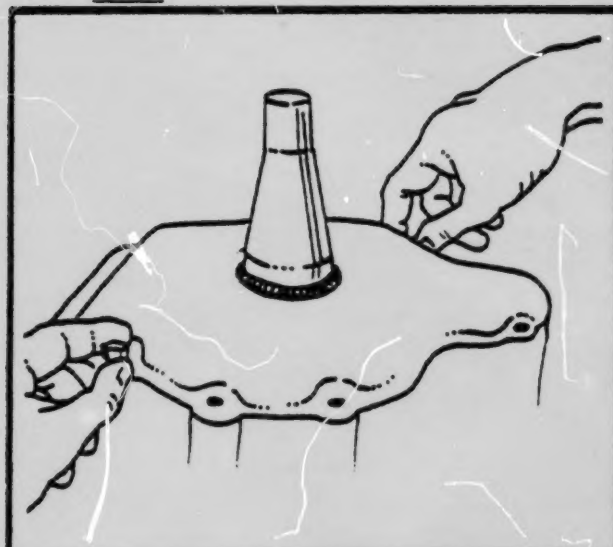
END PLAY SPACE BETWEEN BLOCK  
AND CRANKSHAFT

JOB STEPS

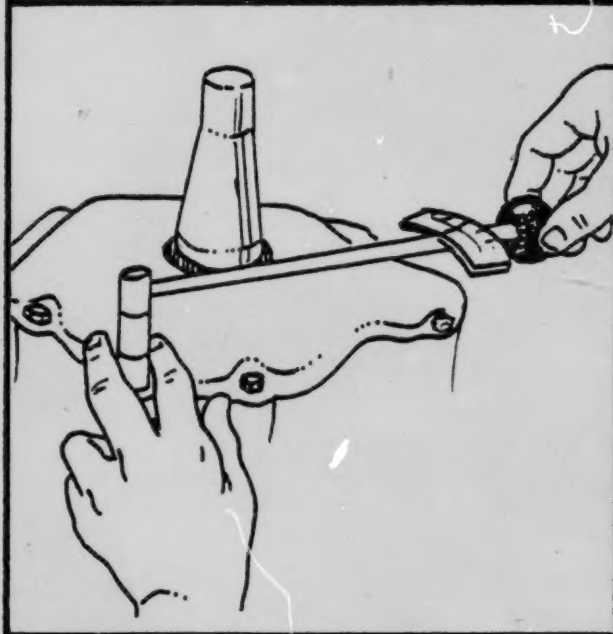
READ:

LOOK:

23. WITH YOUR FINGERS, PUT IN  
AND TIGHTEN THE TWO SUMP BOLTS.



24. WITH YOUR TORQUE WRENCH,  
TIGHTEN THE BOLTS TO THE PROPER  
TORQUE (65 INCH POUNDS).



25. CHECK END PLAY (IF YOU DON'T  
KNOW HOW TO CHECK IT, LOOK AT MOD  
7501 01 017 ON CHECKING END PLAY).

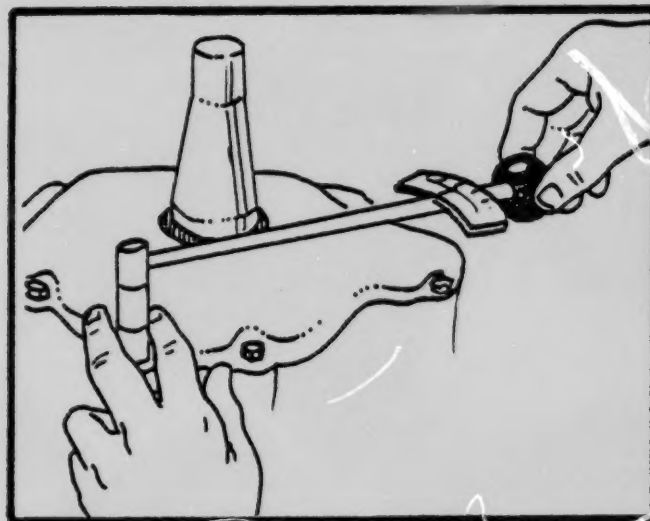
26. IF THE END PLAY ISN'T CORRECT,  
SEE YOUR INSTRUCTOR.

IF THE END PLAY IS CORRECT, PUT IN  
THE REST OF THE SUMP BOLTS.

"TURN THE PAGE"

WORD GUIDELUBRICATED - GREASEDPROTECTOR - KEEPS SEAL SAFE FROM  
SCRATCHESJOB STEPSREAD:

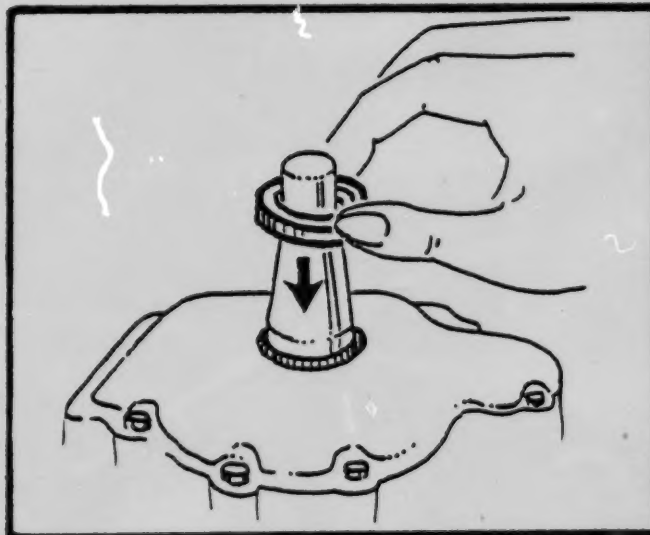
27. WITH YOUR TORQUE WRENCH,  
TORQUE THE BOLTS.

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CORRECTLY LUBRICATED THE CRANKSHAFT.
2. CORRECTLY PUT IN THE SUMP.
3. PROPERLY TORQUED THE SUMP BOLTS.

28. IF YOU HAVE ONE, PUT THE PROPER  
SEAL PROTECTOR ON THE SHAFT (TO  
PROTECT THE SEAL FROM SCRATCHES).  
IF YOU DO NOT HAVE ONE, SEE THE  
INSTRUCTOR.



29. GENTLY SLIDE THE SEAL DOWN  
THE CRANKSHAFT UNTIL IT TOUCHES  
THE SUMP.

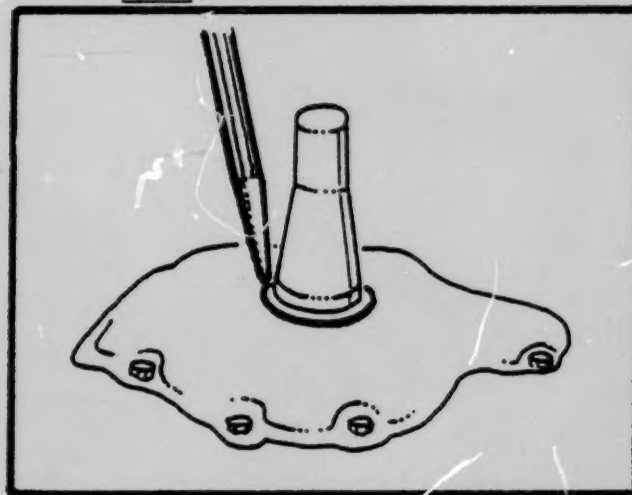
"TURN THE PAGE"

WORD GUIDE

BINDING - TIGHT SPOTS WHEN TURNING  
THE FLYWHEEL

JOB STEPSREAD:

30. WITH A HAMMER AND SEAL DRIVER,  
PUSH THE SEAL IN TIGHT (IF YOU  
DO NOT HAVE A HAMMER AND SEAL DRIVER  
DRIVER, SEE THE INSTRUCTOR).

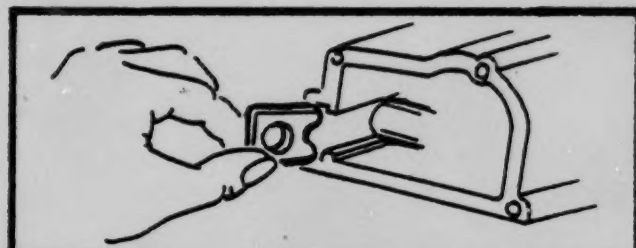
LOOK:

31. BY TURNING THE FLYWHEEL, CHECK  
THE ENGINE FOR BINDING.

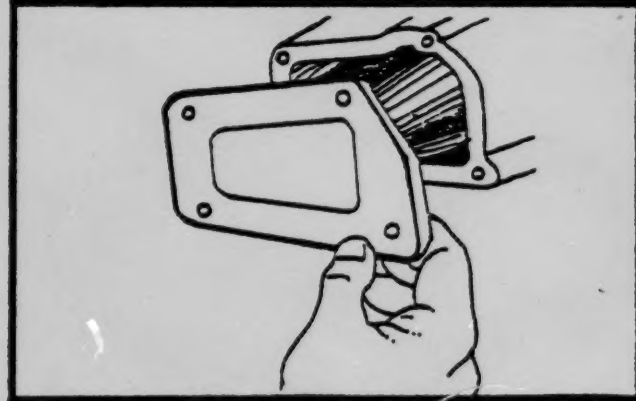
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT PROPER SEAL PROTECTOR ON A SHAFT UNTIL  
IT SITS TIGHTLY WITH SUMP.
2. CHECKED THE ENGINE FOR BINDING.

32. PUSH THE GEAR AND SHAFT  
TO THE RIGHT AND PUT IN THE  
SHAFT STOP.



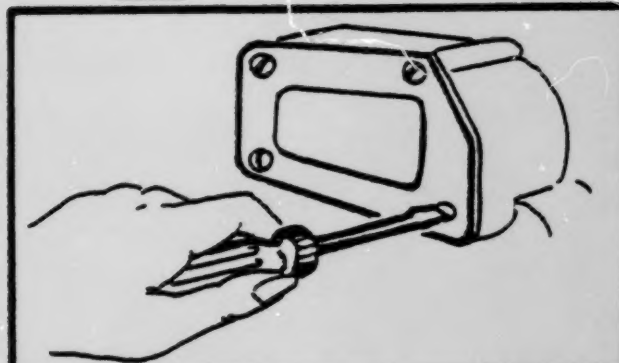
33. PUT ON THE NEW AUXILIARY  
COVER GASKET AND THE COVER.



"TURN THE PAGE"

JOB STEPSREAD:

34. WITH YOUR SCREWDRIVER, TIGHTEN THE SCREWS.

LOOK:

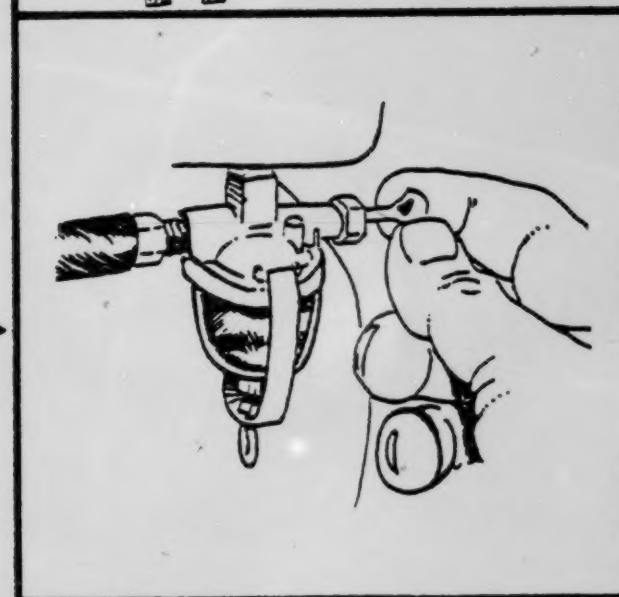
35. REPLACE THE OIL PLUG AT THE BOTTOM OF THE ENGINE.



36. FILL THE ENGINE WITH OIL AND FUEL.



37. OPEN UP THE FUEL LINE.



JOB STEPSREAD:LOOK:

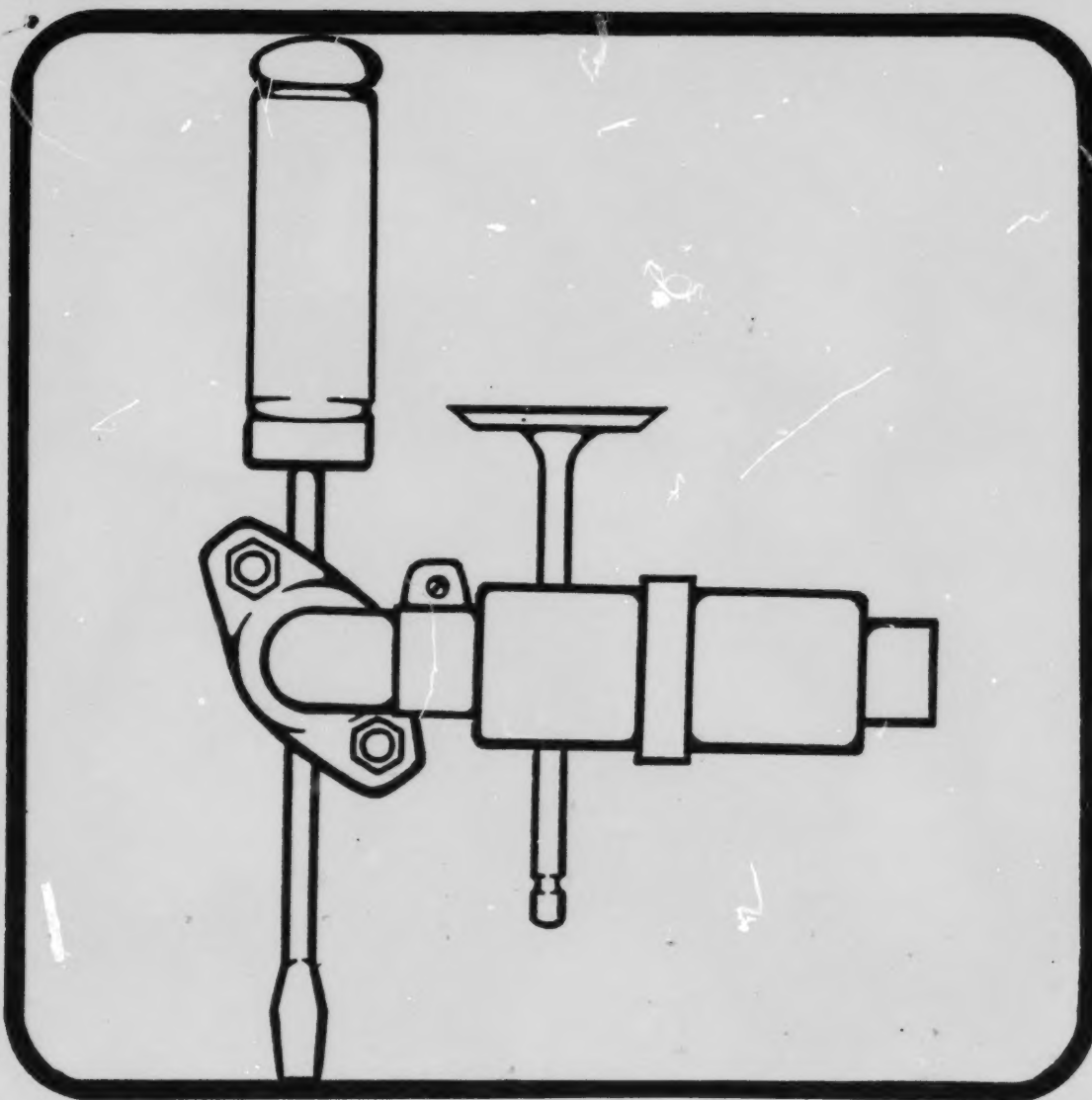
38. START THE ENGINE AND CHECK  
FOR OIL LEAKS.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT ON NEW COVER GASKET AND COVER.
2. REPLACED THE OIL PLUG.
3. FILLED ENGINE WITH FUEL AND OIL.
4. OPENED THE FUEL LINE, STARTED THE ENGINE,  
AND CHECKED FOR OIL LEAKS.





## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 003 1 7501 01 003 3 date: AUGUST 1977 level:       

skill title: REMOVE CYLINDER HEAD, CHECK FOR WARP, ATTACH  
TO BLOCK AND TORQUE

developed & written by: JIM PITTS AND DWIGHT SMITH

visuals by: DAVE WEHRWEIN 25

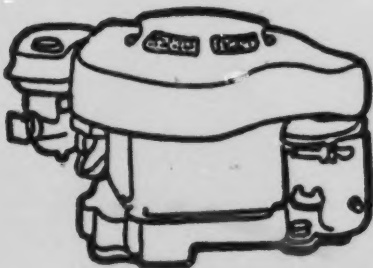
WORD GUIDE

CYLINDER HEAD - METAL PART BOLTED  
ON TOP OF THE BLOCK WHICH  
HOLDS THE PISTONS.

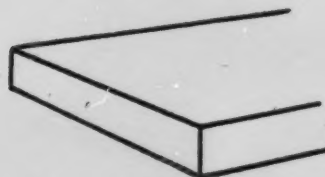
WARPING - BENDING

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

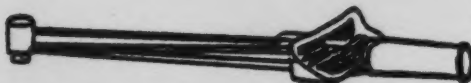
1. HOW TO REMOVE CYLINDER HEAD
2. HOW TO CHECK HEAD FOR WARPING.
3. HOW TO PUT THE HEAD BACK ON THE ENGINE BLOCK AND TORQUE IT TO THE SERVICE MANUAL SPECIFICATIONS.

AND IN ORDER TO DO THIS YOU WILL NEED:

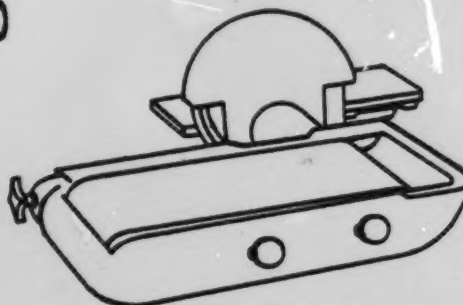
ENGINE BLOCK

SURFACE  
BLOCK

SOCKET SET

TORQUE  
WRENCH

SAFETY GLASSES



BELT SANDER

FEELER GAUGE  
SET

"TURN THE PAGE"

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE ALL THE EQUIPMENT YOU NEED.
2. YOU HAVE REMOVED THE CYLINDER HEAD.
3. YOU HAVE CHECKED THE HEAD AND PUT IT BACK ONTO THE ENGINE.
4. THE ENGINE RUNS WITHOUT ANY GASKET LEAKS.

"TURN THE PAGE"

WORD GUIDE

CYLINDER (HEAD) - METAL SECTION  
BOLTED TO TOP OF BLOCK

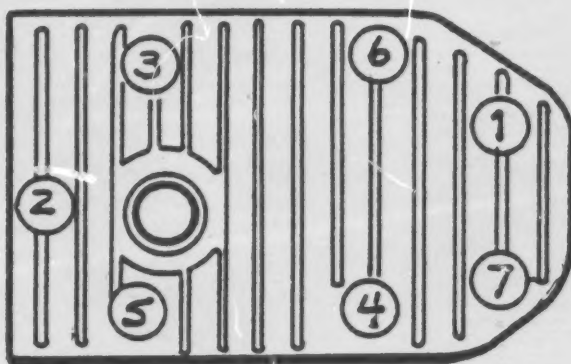
INFORMATION

YOU NEED TO KNOW HOW TO REMOVE A CYLINDER HEAD, INSPECT AND SERVICE IT AND HOW TO PROPERLY PUT IT BACK ON THE BLOCK.

WHEN YOU TAKE THE SCREWS OUT OF THE HEAD, BE SURE TO SEE IF SOME ARE DIFFERENT LENGTHS. IF SOME ARE, BE SURE TO PUT THEM BACK IN THE RIGHT HOLES.

YOU MUST ALSO CHECK THE SERVICE MANUAL FOR PROPER HEAD SCREW TIGHTENING SEQUENCE AND TORQUE SPECIFICATIONS.

FOR A B & S MODEL 92902, THE SEQUENCE IS:



THE PROPER TORQUE SPECIFICATION IS 140 INCH POUNDS. BE SURE NOT TO USE GASKET CEMENT ON THE HEAD GASKET.

JOB STEPS

WORD GUIDE  
LABEL - WRITE DOWN NAME OF  
SOMETHING

READ:

LOOK:

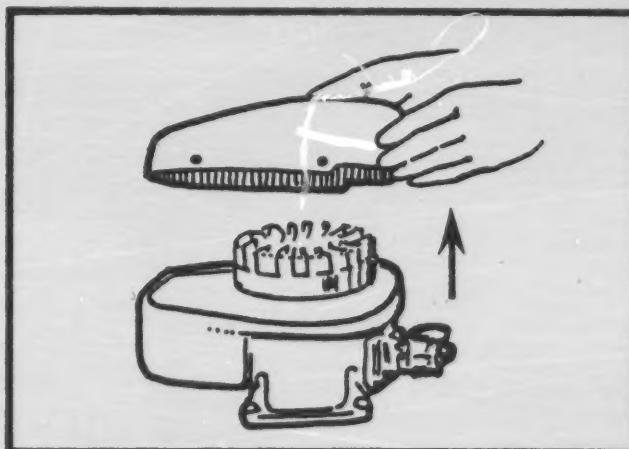
1. TAKE ALL MATERIALS TO YOUR  
WORK AREA. WEAR YOUR SAFETY  
GLASSES.



2. USING A RAG, CLEAN THE  
LOOSE GREASE OFF THE BLOCK AND  
HEAD.



3. REMOVE THE SHROUD IF IT IS  
ATTACHED TO THE HEAD.





JOB STEPS

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL THE MATERIALS YOU NEED FOR THIS MOD.
2. CLEANED THE ENGINE IN THE RIGHT WAY.
3. REMOVED THE SHROUD, IF NEEDED.

READ:

LOOK:

4. USING THE SOCKET SET, REMOVE THE CYLINDER HEAD BOLTS.

→  
NOTE: LABEL THE BOLTS SO YOU CAN PUT THEM BACK IN THE SAME PLACE.

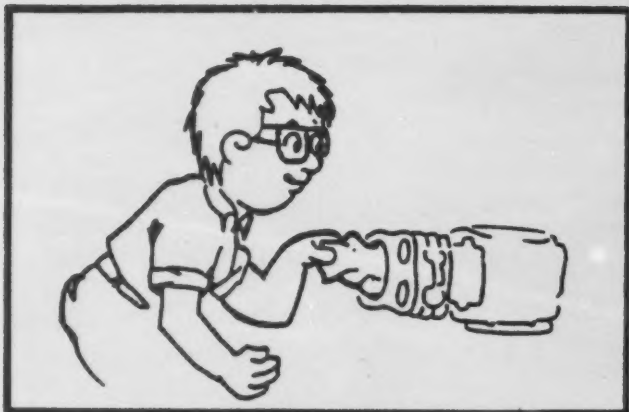


5. REMOVE THE HEAD.



6. TURN THE ENGINE SO THAT THE PISTON IS ABOUT TWO INCHES (2") DOWN.

7. PUT A CLEAN RAG IN THE CYLINDER TO KEEP OUT DIRT.



JOB STEPSREAD:

8. USE A CARBON SCRAPER AND WIRE BRUSH TO CLEAN ALL THE CARBON ON THE HEAD. BE SURE TO GET THE PINS CLEAN.



9. TURN THE ENGINE SO THE PISTON IS AT THE TOP. REMOVE THE RAG.

LOOK:

10. SCRAPE THE CARBON OFF THE PISTON.



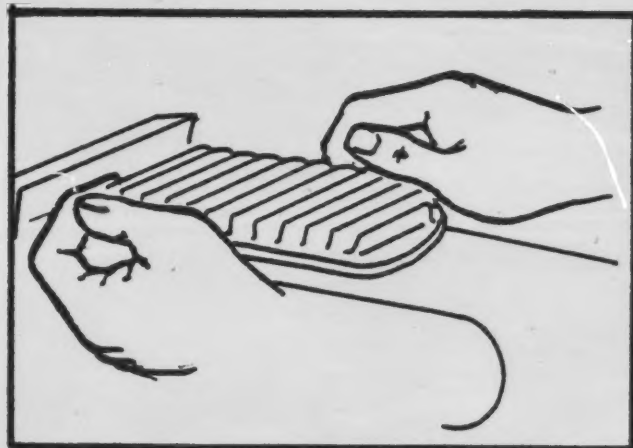
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE HEAD.
2. LABELED THE BOLTS.
3. CLEANED THE HEAD AND PISTON TOP.

11. LAY THE HEAD ON THE BELT SANDER. HOLD IT TIGHT SO IT WILL NOT MOVE.

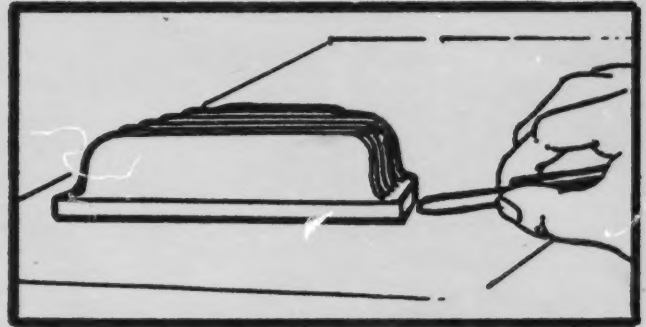


12. TURN ON THE BELT SANDER FOR ABOUT 30 SECONDS. BE SURE NOT TO SAND OFF TOO MUCH.



JOB STEPS

13. PUT THE HEAD ON THE SURFACE PLATE. USE A THICKNESS GAUGE TO SEE IF IT IS FLAT.

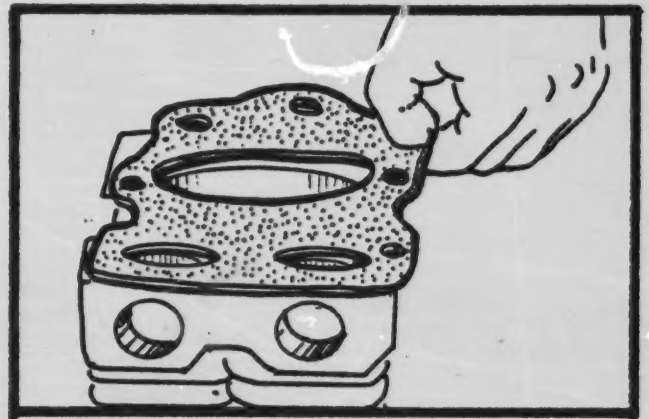


NOTE: IF THE HEAD IS FLAT, GO ON TO THE NEXT JOB STEP. IF THE HEAD IS NOT FLAT ENOUGH, DO JOB STEPS 12 AND 13 AGAIN.

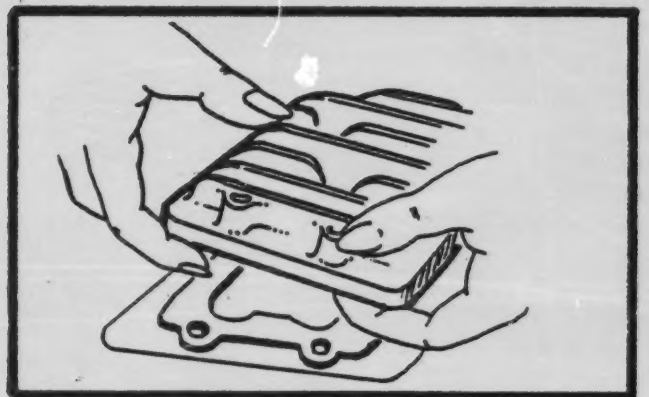
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

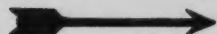
1. SANDED THE HEAD.
2. CHECKED THE FLATNESS OF THE HEAD.

14. PUT A NEW HEAD GASKET ON THE BLOCK. BE SURE THE HOLES LINE UP FOR THE PINS. DO NOT USE GASKET CEMENT.



15. PUT THE HEAD ON THE BLOCK. PUT THE BOLTS BACK INTO THE SAME HOLES THEY CAME FROM.





SEQUENCE - ORDER OF DOING SOMETHING

CONNECT - PUT TOGETHER; ATTACH

JOB STEPS

READ:

16. TORQUE THE BOLTS IN THE PROPER TIGHTENING SEQUENCE (CHECK IN THE SERVICE MANUAL FOR THE PROPER SEQUENCE).



LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

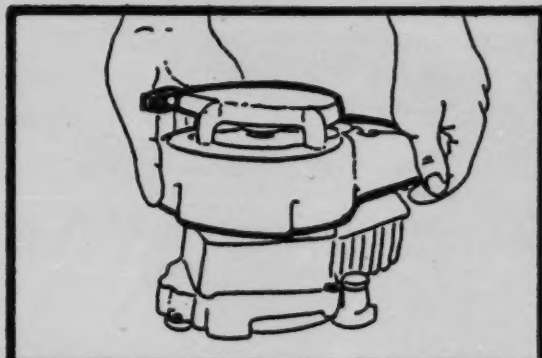
1. PUT THE HEAD GASKET ON.
2. PUT THE BOLTS BACK INTO THE RIGHT PLACES.
3. TORQUED THE BOLTS .

17. PUT THE SHROUD BACK ONTO THE ENGINE.



18. CHECK THE OIL LEVEL IN THE ENGINE.

19. PUT IN THE SPARK PLUG AND CONNECT THE WIRE.



"TURN THE PAGE"

JOB STEPS

READ:

20. START THE ENGINE AND CHECK FOR LEAKS AROUND THE GASKET.



LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT THE SHROUD BACK ON.
2. CHECKED THE OIL LEVEL.
3. STARTED THE ENGINE.

21. SHUT OFF THE ENGINE.

22. TORQUE THE HEAD BOLTS AGAIN.



23. PUT AWAY ALL THE SUPPLIES, TOOLS AND EQUIPMENT AND CLEAN UP THE WORK AREA.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. RUN THE ENGINE WITH NO LEAKS.
2. TORQUED THE HEAD BOLTS AGAIN.
3. CLEANED UP THE WORK AREA AND PUT AWAY TOOLS.





## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 004 1 7501 01 004 3 date: SEPT. 77 level:       

skill title: SERVICING CAMSHAFTS

developed & written by: JIM PITTS AND DWIGHT SMITH

visuals by: DAVE WEHRWEIN

## PERFORMANCE OBJECTIVE

### YOU ARE GOING TO LEARN:

HOW TO REMOVE CAMSHAFT AND TAPPETS

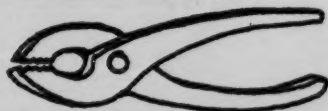
HOW TO CHECK CAMSHAFTS FOR CRACKS, CHIPPED TEETH AND WORN LOBES

HOW TO MIKE JOURNALS AND INSTALL CAMSHAFTS

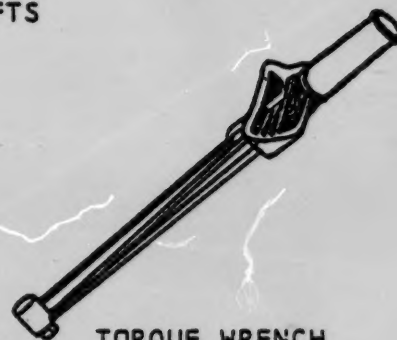
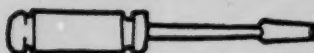
### AND IN ORDER TO DO THIS YOU WILL NEED:



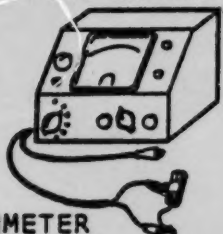
FOUR-CYCLE ENGINE



HAND TOOLS



TORQUE WRENCH



MICROMETER



SERVICE MANUAL  
FOR ENGINE



SAFETY GLASSES

### WE WILL KNOW YOU CAN DO IT WHEN:

YOU HAVE GATHERED THE EQUIPMENT FOR THIS MOD.

YOU HAVE REMOVED THE CAM SHAFT AND TAPPETS.

YOU HAVE CHECKED THE CAMSHAFT FOR CRACKS, CHIPPED TEETH AND WORN LOBES.

YOU HAVE INSTALLED THE CAM AND TIMED IT ACCORDING TO SERVICE SPECIFICATIONS.

"TURN THE PAGE"

JOB STEPS

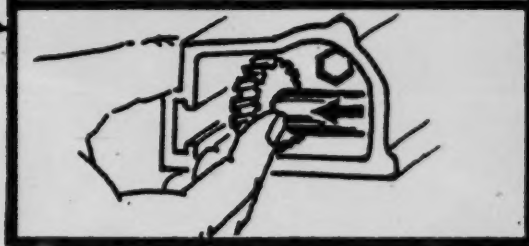
READ:

LOOK:

1. TAKE ALL EQUIPMENT AND MATERIALS TO YOUR WORK AREA. WEAR YOUR SAFETY GLASSES.



2. REMOVE THE ENGINE SUMP, AS YOU DID IN MOD 7501 01 002 1  
7501 01 002 3



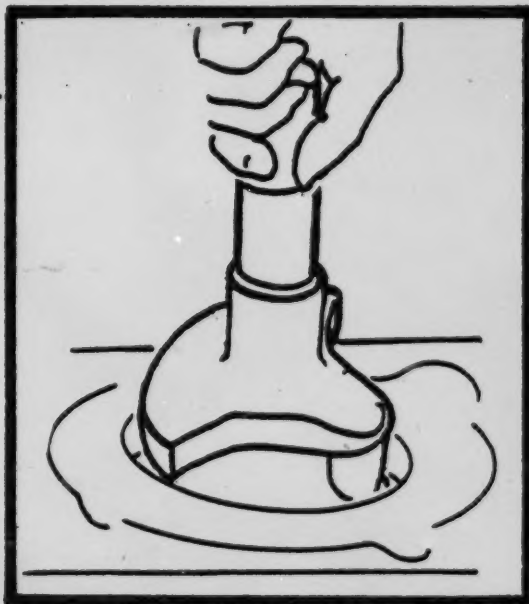
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL THE EQUIPMENT FOR THIS MOD.
2. THE RIGHT ENGINE TO WORK ON.
3. REMOVED THE ENGINE SUMP.

3. REMOVE THE CAMSHAFT, AS YOU DID IN MOD 7501 01 021 1  
7501 01 021 3



LOOK CAREFULLY WHERE EACH TAPPET COMES FROM AND WATCH AS YOU REMOVE THE CAMSHAFT. THE TAPPETS MUST GO BACK INTO THE SAME HOLES.

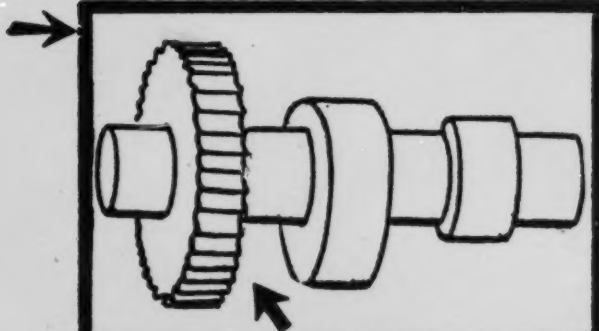


"TURN THE PAGE"

READ:

LOOK:

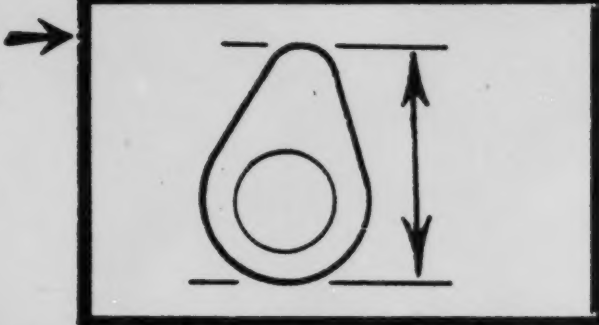
4. LOOK CAREFULLY AT THE CAM GEAR FOR CRACKS, CHIPS OR WORN TEETH.



5. LOOK UP THE SPECIFICATIONS IN THE SERVICE MANUAL FOR THE CAM LOBES.



6. MEASURE THE CAM LOBES WITH THE MICROMETER. IF YOU HAVE QUESTIONS ABOUT USING THE MICROMETER, ASK YOUR INSTRUCTOR.



NOTE: ARE THE CAM LOBES WITHIN SPECIFICATIONS? IF NOT, TELL YOUR INSTRUCTOR.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE CRANKSHAFT AND KNOW WHERE ALL TAPPETS GO.
2. CHECKED THE CAM GEAR CAREFULLY.
3. CHECKED THE CAM LOBES AGAINST THE SPECIFICATIONS.

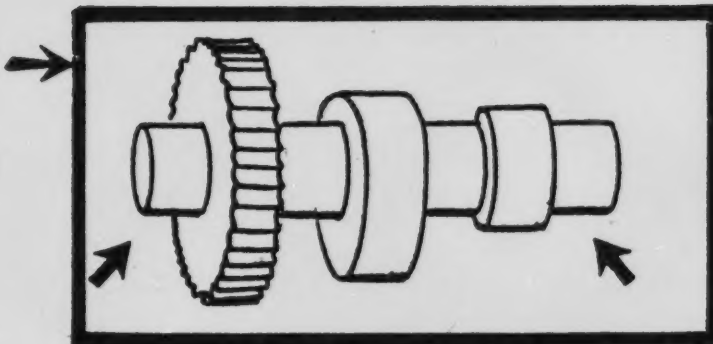
"TURN THE PAGE"

READ:

7. FIND THE CAM JOURNALS SPECIFICATIONS AND MEASURE THE CAM JOURNALS WITH THE MICROMETER.

NOTE: ARE THE JOURNALS WITHIN SPECIFICATIONS? IF NOT, TELL YOUR INSTRUCTOR.

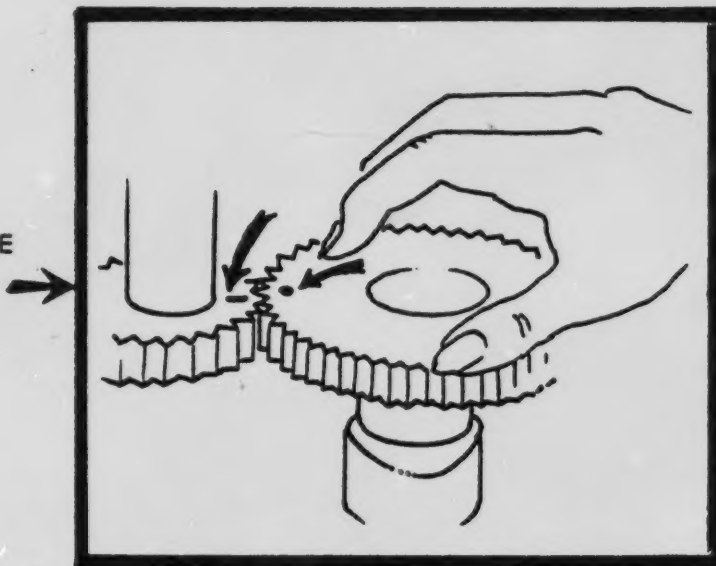
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THE JOURNALS WITH YOU.

8. PUT THE TAPPETS IN THE SAME HOLES FROM WHERE THEY CAME.

9. FIND THE TIMING MARK ON THE CRANKSHAFT.



10. TURN THE CRANKSHAFT SO THE MARKS ON THE CAM GEAR LINE UP WITH THE CRANKSHAFT GEAR.

"TURN THE PAGE"

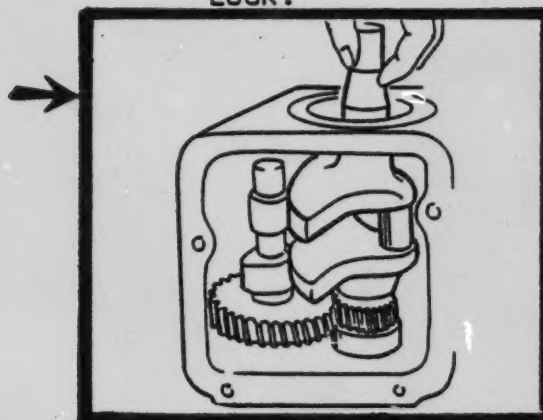


WORD GUIDEALIGN - PUT IN CORRECT POSITION

READ:

11. PUT IN THE CAMSHAFT ALL THE WAY.

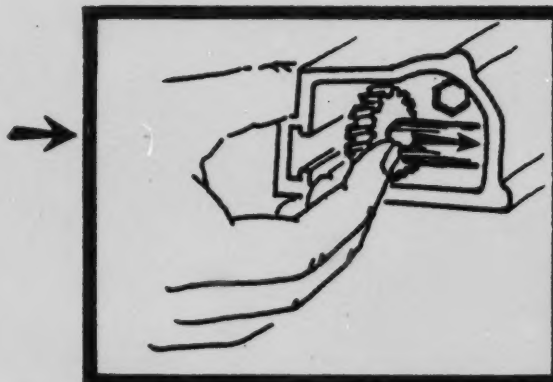
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT ALL TAPPETS IN THE RIGHT HOLES.
2. ALIGNED THE TIMING MARKS ON THE GEARS.
3. PUT IN THE CAMSHAFT PROPERLY.

12. INSTALL THE ENGINE SUMP, AS YOU DID IN MOD 7501 01 002 1  
7501 01 002 3  
BE SURE TO USE NEW GASKETS AND SEALS AND TO TORQUE ALL BOLTS PROPERLY.



13. CHECK THE ENGINE OIL.

"TURN THE PAGE"

READ:

14. START THE ENGINE. WHEN IT IS RUNNING WELL, SHUT IT OFF.

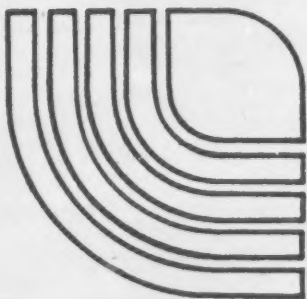
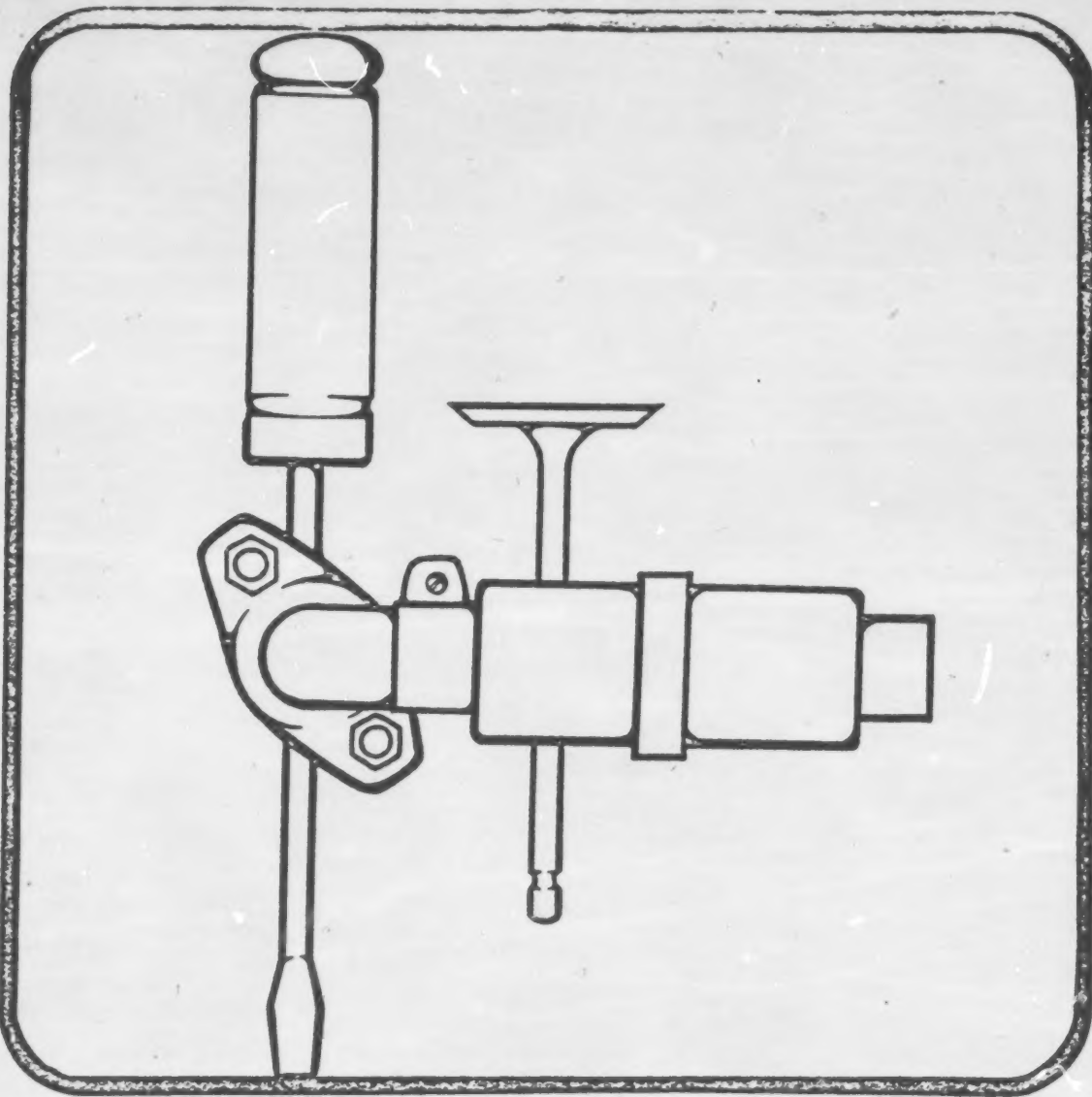
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO START THE ENGINE AND LISTEN TO IT RUN.

15. CLEAN UP THE WORK AREA AND PUT AWAY ALL TOOLS AND EQUIPMENT.

CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR CLEAN UP JOB.



## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 009 1 7501 01 009 3 date: OCTOBER 1977 level: IV

skill title: HOW TO TAKE APART, LOOK CLOSELY AT, AND CLEAN

ENGINE PARTS

developed & written by: DWIGHT SMITH

visuals by: DAVE WEHRWEIN



# WORD GUIDE

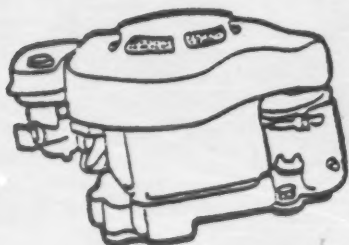
## GUIDELINES - RULES

### PERFORMANCE OBJECTIVE

#### YOU ARE GOING TO LEARN:

1. HOW TO TAKE APART, LOOK CLOSELY AT, AND CLEAN ENGINE PARTS.
2. HOW TO PUT IN RINGS, PISTONS AND CRANK SHAFT.
3. HOW TO CHECK VALVE TIMING.

#### AND IN ORDER TO DO THIS YOU WILL NEED:



4 CYCLE ENGINE



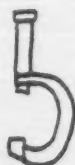
HAND TOOLS



TORQUE WRENCH



RING COMPRESSOR



MICROMETER

RING GROOVE  
CLEANER

FEELER GAUGE

NEW SEALS, GASKETS, AND OTHER  
PARTS AS NEEDED

"TURN THE PAGE"

. . . YOU WILL NEED:



PENCIL AND PAPER



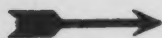
SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

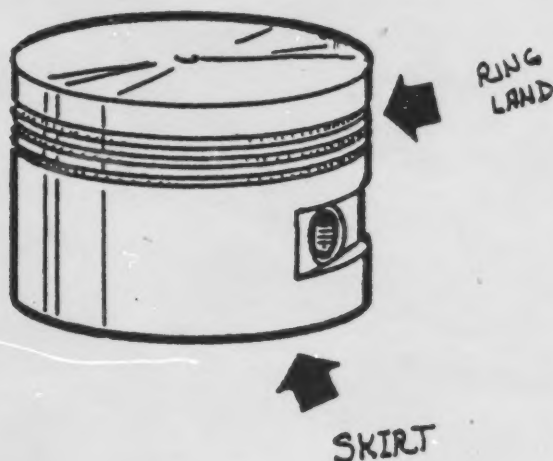
1. YOU HAVE ALL THE EQUIPMENT FOR THIS MOD.
2. YOU HAVE TAKEN THE ENGINE APART, LOOKED AT IT CLOSELY, AND CLEANED THE PARTS.
3. YOU HAVE PUT IN RINGS, PISTONS AND CRANKSHAFT.
4. YOU HAVE CHECKED THE VALVE TIMING TO SERVICE MANUAL GUIDELINES.
5. THE ENGINE RUNS RIGHT.
6. YOU HAVE CLEANED UP THE MACHINE AND THE WORK AREA AND PUT AWAY ALL EQUIPMENT.

"TURN THE PAGE"

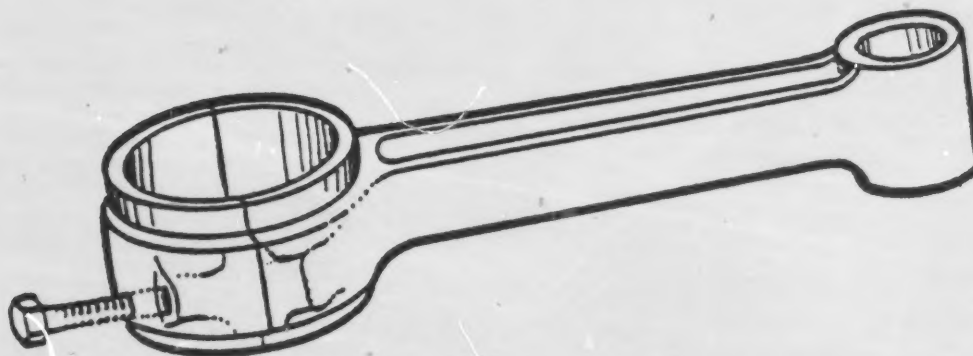


WORD GUIDEREPLACED - PUT BACKINFORMATION

NOT EVERY PISTON IS ROUND. SOME PISTONS ARE CAM GROUND. THIS MEANS THAT THEY ARE WIDER ACROSS ONE SIDE THAN THE OTHER. THIS HELPS THE PISTON FIT BETTER AFTER IT GETS HOT. THE WIDE SIDE IS USUALLY ON THE OTHER SIDE FROM THE WRIST PIN. NOTICE THAT THE PISTON IS SMALLER AT THE RING LAND AREA THAN AT THE SKIRT. STUDY THE PICTURE AND LEARN ALL THE PARTS.

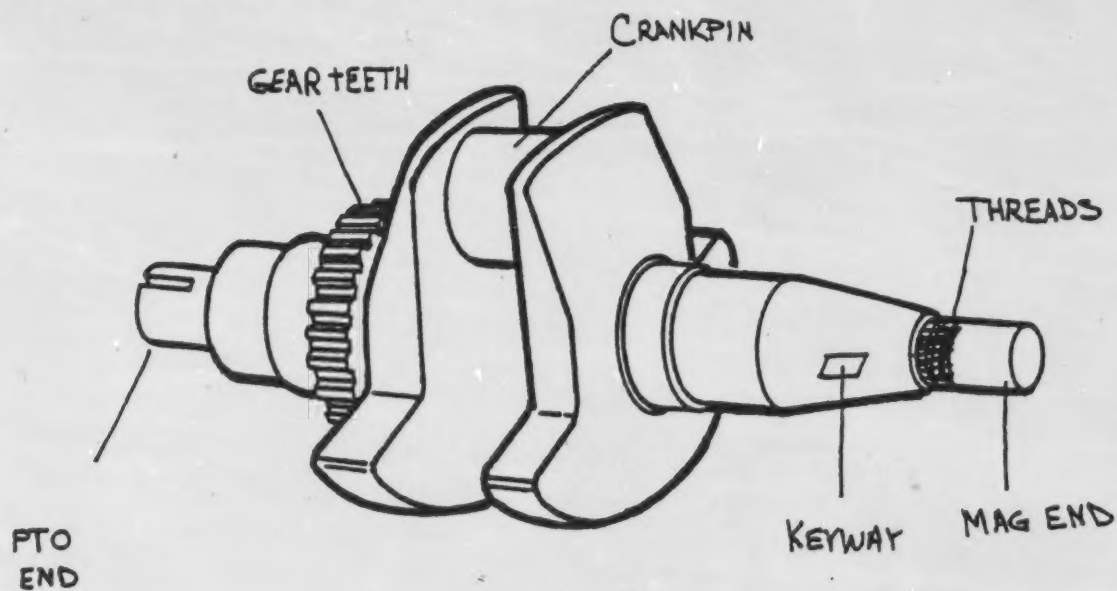


THE CONNECTING ROD HOLDS THE PISTON AND ATTACHES IT TO THE CRANKSHAFT. IT MUST BE VERY STRONG, AND IT MUST BE REPLACED THE WAY IT CAME APART. BE SURE TO NOTICE THE MATCHING MARKS ON THE ROD CAP. STUDY THE PICTURE AND LEARN ALL THE PARTS.



INFORMATION

THE CRANKSHAFT CHANGES THE UP-AND-DOWN MOTION OF THE PISTON AND CONNECTING ROD INTO THE TURNING MOTION OF THE ENGINE. STUDY THE PICTURE AND LEARN ALL THE PARTS.



WORD GUIDEREMOVE - TAKE OFFJOB STEPS

READ:

1. GET ALL EQUIPMENT AND TAKE IT TO YOUR WORK AREA.

2. USING A WRENCH, REMOVE THE AIR HOUSING.

3. USING A SOCKET, REMOVE THE HEAD BOLTS AND HEAD.

LOOK:



"TURN THE PAGE"

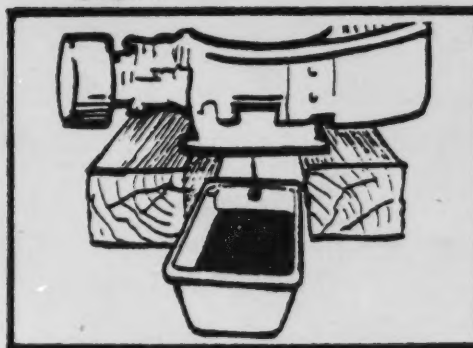
JOB STEPS

## READ:

4. PUT A DRAIN PAN UNDER THE DRAIN AND DRAIN THE OIL.



## LOOK:

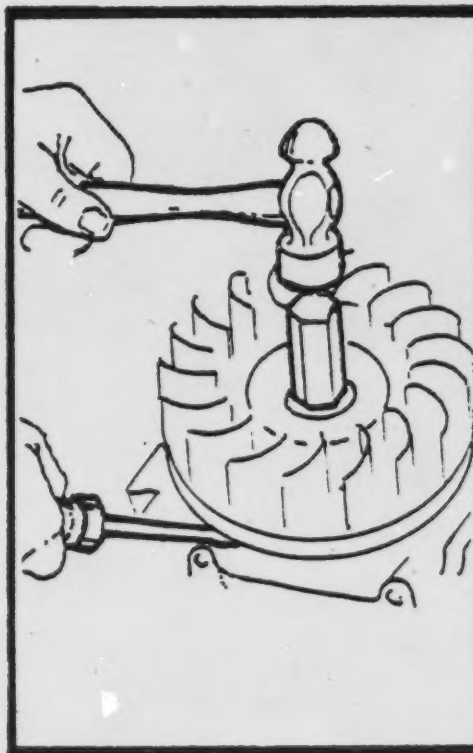


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL YOUR EQUIPMENT.
2. REMOVED THE AIR HOUSING.
3. REMOVED THE HEAD BOLTS AND THE HEAD.
4. DRAINED THE OIL FROM THE ENGINE.

5. REMOVE THE FLYWHEEL. BE SURE TO FOLLOW THE SPECIAL GUIDELINES FOR THE TYPE OF ENGINE ON WHICH YOU ARE WORKING.

- A. BRIGGS AND STRATTON - USE A SPECIAL PULLER OR A KNOCK-OFF TOOL TO REMOVE THE FLYWHEEL.
- B. TECUMSEH - IF THE FLYWHEEL HAS PULLER HOLES, USE A PULLER. IF NO PULLER HOLES, USE A KNOCK-OFF TOOL.
- C. CLINTON - USE A KNOCK-OFF TOOL ON ALL CLINTON FLYWHEELS.
- D. KOHLER - ALWAYS USE THE RIGHT PULLER AND THE BOLT HOLES IN THE FLYWHEEL TO REMOVE THE FLYWHEEL OR ELSE THE CRANKSHAFT WILL BREAK.



SOME KOHLER ENGINES USE CERAMIC MAGNETS FOR THE MAGNETO. THESE CAN BREAK, SO ALWAYS USE A PULLER ON A KOHLER ENGINE TO REMOVE THE FLYWHEEL.

"TURN THE PAGE"

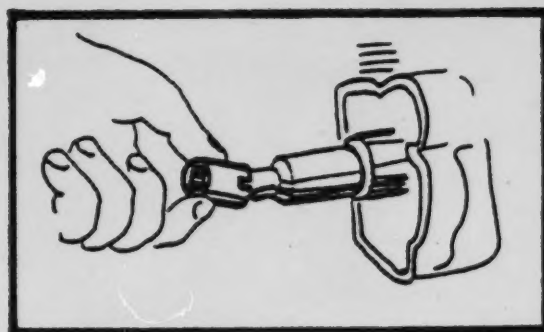
JOB STEPS

READ:

6. IF THE ENGINE HAS A POINT CAM YOU CAN TAKE OFF, PULL IT OFF.

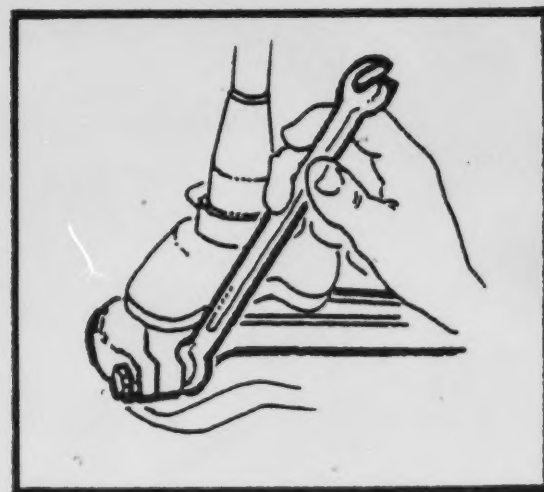
NOTE: CLINTON AND TECUMSEH ENGINES MAY HAVE ONE, BRIGGS MAY NOT.

LOOK:



7. REMOVE THE SUMP AS YOU LEARNED IN MOD 7501 01 001.

8. USING A WRENCH, REMOVE THE ROD BOLTS OR NUTS.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE FLYWHEEL RIGHT.
2. REMOVED THE POINT CAM.
3. REMOVED THE SUMP.
4. REMOVED THE ROD BOLTS OR NUTS.

"TURN THE PAGE"

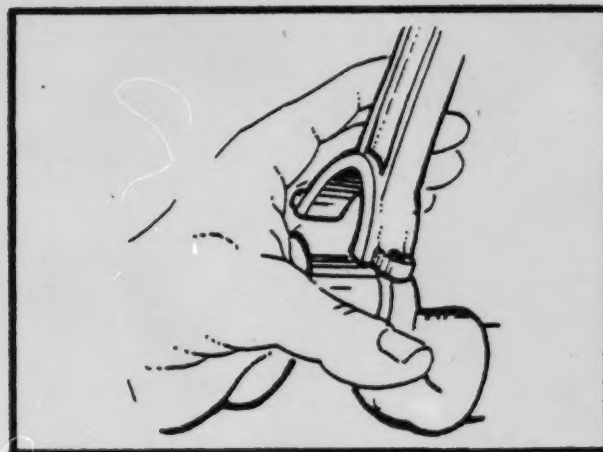


JOB STEPS

READ:

9. LOOK WITH CARE AT THE ROD AND HOW IT FITS IN THE ENGINE. THE ROD MUST GO BACK THE SAME WAY IT IS NOW.

LOOK:

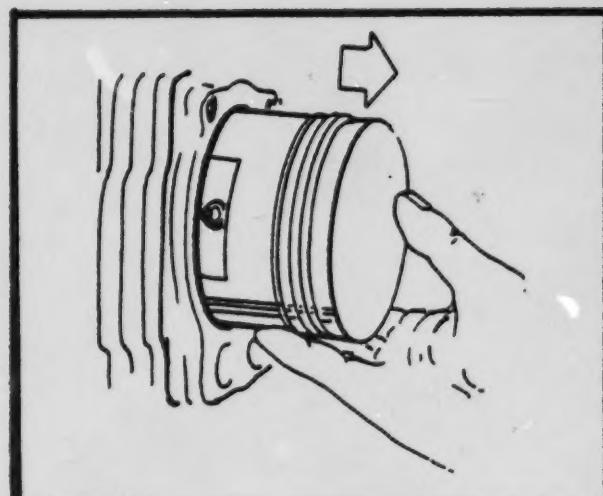


10. REMOVE THE ROD AND PISTON FROM THE BLOCK LIKE THIS:

1. PUSH UP WITH ONE HAND.

2. USE OTHER HAND TO HOLD PISTON WHEN IT COMES OUT.

11. TAKE THE PISTON RINGS OFF THE PISTON, STARTING WITH THE TOP RING. SPREAD THE RINGS WITH YOUR FINGERS AND TAKE THEM OFF THE TOP.



"TURN THE PAGE"

WORD GUIDE

DAMAGE - BREAKS, CUTS, BENDS, ETC.

SCORING - SCRAPING OR SCRATCHING  
OF METAL PARTS

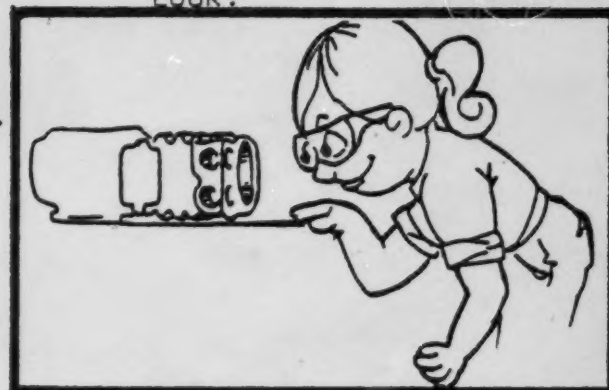
GALLING - LOOKS LIKE A WELD ON A  
PISTON, OR A RIP IN A CYLINDER

JOB STEPS

READ:

12. LOOK WITH CARE AT THE PISTON AND THE CYLINDER. LOOK FOR ANY SIGNS OF WEAR OR DAMAGE LIKE SCORING OR GALLING. ON CHROME-PLATED CYLINDERS, LOOK FOR PEELING CHROME. ON ALUMINUM CYLINDERS LOOK FOR GALLING.

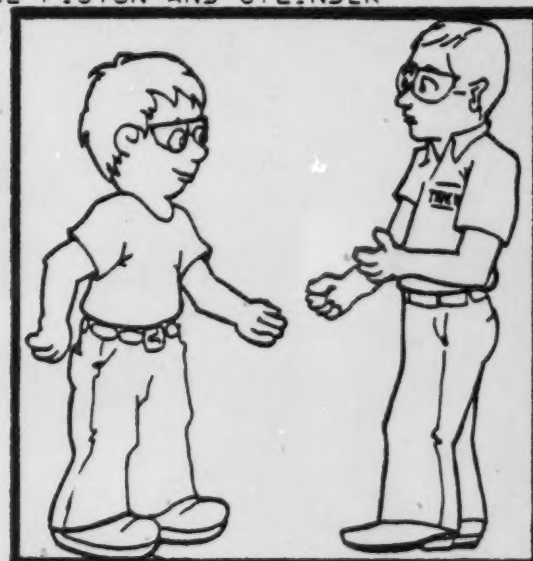
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. STUDIED THE ROD AND CRANKSHAFT BEFORE TAKING THEM APART.
2. REMOVED THE PISTON AND ROD FROM THE THE TOP OF THE CYLINDER.
3. TAKEN THE PISTON RINGS OFF THE TOP OF THE PISTON.
4. LOOKED CLOSELY AT THE PISTON AND CYLINDER FOR WEAR AND DAMAGE.

13. IF YOU SEE THERE IS NO DAMAGE TO THE CRANKSHAFT, GO ON WITH THIS MOD. IF YOU SEE DAMAGE OR WEAR, TELL YOUR INSTRUCTOR.



WORD GUIDE

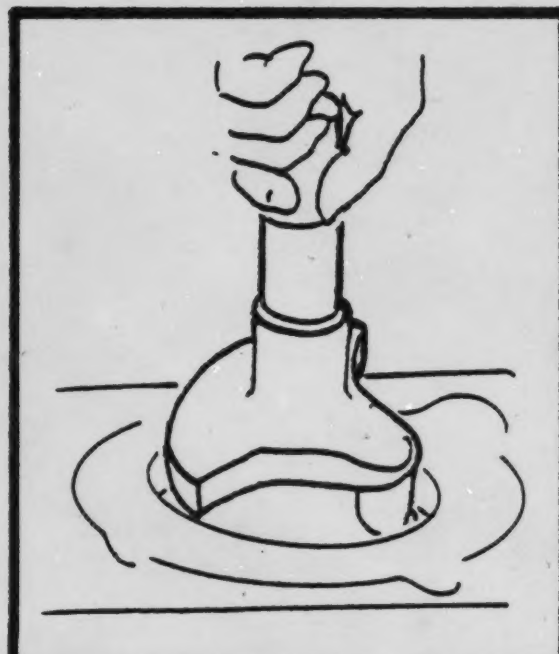
REJECTION SIZE - THROW-AWAY, OR  
WORN-OUT SIZE

JOB STEPS

READ:

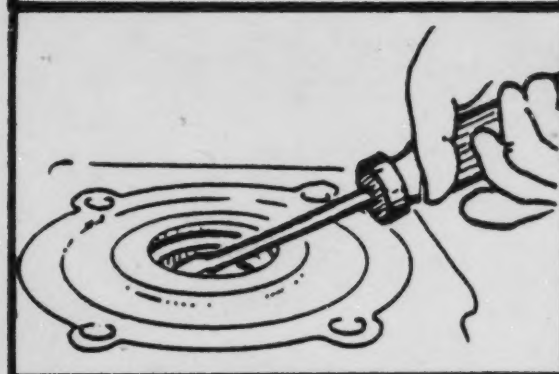
LOOK:

14. REMOVE THE CRANKSHAFT. BE VERY CAREFUL NOT TO SCRATCH OR DROP IT.



15. USE THE MICROMETER TO MEASURE THE ROD (CRANKPIN) JOURNAL, THE P.T.O. JOURNAL, AND THE MAGNETO JOURNAL LIKE YOU DID IN MOD 7501 01 022. CHECK THE REJECTION SIZE WITH THE REPAIR MANUAL FOR YOUR ENGINE.

16. REMOVE THE OIL SEALS FROM THE BLOCK AND SUMP LIKE YOU DID IN MOD 7501 01 001.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE CRANKSHAFT AND FOUND NO DAMAGE.
2. REMOVED THE CRANKSHAFT.
3. MEASURED AND LOOKED CLOSELY AT THE CRANKSHAFT AND CHECKED THE REJECTION SIZES IN THE REPAIR MANUAL.
4. REMOVED THE OIL SEALS FROM THE SUMP AND BLOCK.

"TURN THE PAGE"

WORD GUIDE

DEGLAZE - ROUGH-UP A CYLINDER  
WITH A HONE

CLEARANCE - SPACE BETWEEN PARTS

JOB STEPS

READ:

17. DEGLAZE THE CYLINDER LIKE  
YOU DID IN MOD 7501 06 004.



18. FIND THE CLEARANCE GUIDELINES  
FOR THIS ENGINE IN THE REPAIR  
MANUAL.



19. HOLD ON TO THE ROD AND PUT  
THE PISTON TOP INTO THE CYLINDER.

A. USE A FEELER GAUGE OF THE RIGHT  
SIZE TO CHECK THE CLEARANCE  
BETWEEN THE PISTON AND THE  
CYLINDER.

B. CHECK THE CLEARANCE OPPOSITE  
THE WRIST PIN HOLES.

C. IF THE CLEARANCE IS CORRECT, GO  
ON WITH THE MOD.

D. IF THE CLEARANCE IS MORE OR  
LESS THAN IN THE REPAIR MANUAL,  
TELL YOUR INSTRUCTOR.



"TURN THE PAGE"

JOB STEPS

READ:

20. ON THE WORK ORDER, LIST ALL PARTS YOU NEED TO REBUILD THE ENGINE.

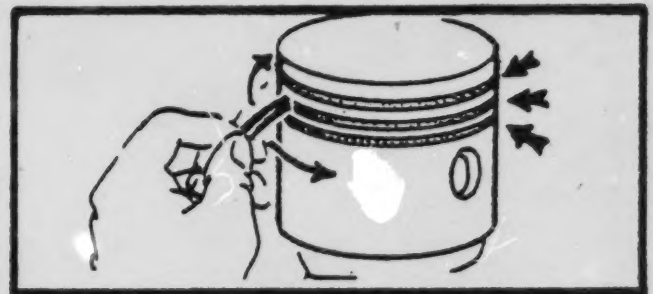
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. DEGLAZED THE CYLINDER RIGHT.
2. FOUND THE RIGHT CLEARANCE GUIDELINES IN THE REPAIR MANUAL.
3. CHECKED THE PISTON-TO-CYLINDER CLEARANCE.
4. LISTED ALL THE PARTS YOU NEED FOR THE REBUILDING OF THIS ENGINE.

21. USE A RING GROOVE CLEANER TO CLEAN ALL THE CARBON OUT OF THE RING GROOVE. IF THERE IS NOT A RING GROOVE CLEANER FOR YOU TO USE, BREAK AN OLD RING IN HALF AND GRIND ONE END FLAT AND THE OTHER END SMOOTH.



22. PUT ONE OF THE NEW RINGS INTO THE CYLINDER. USE THE PISTON TOP TO PUSH IT DOWN TO THE END OF THE RING TRAVEL (YOU CAN SEE WHERE THE END OF THE RING TRAVEL IS).



"TURN THE PAGE"



JOB STEPS

READ:

23. CHECK THE RING END GAP. THE GUIDELINES SHOULD BE IN THE MANUAL. IF THE GUIDELINES ARE NOT IN THE MANUAL, HERE IS A GOOD RULE:

ALLOW ABOUT .003" FOR EACH INCH OF RING DIAMETER.

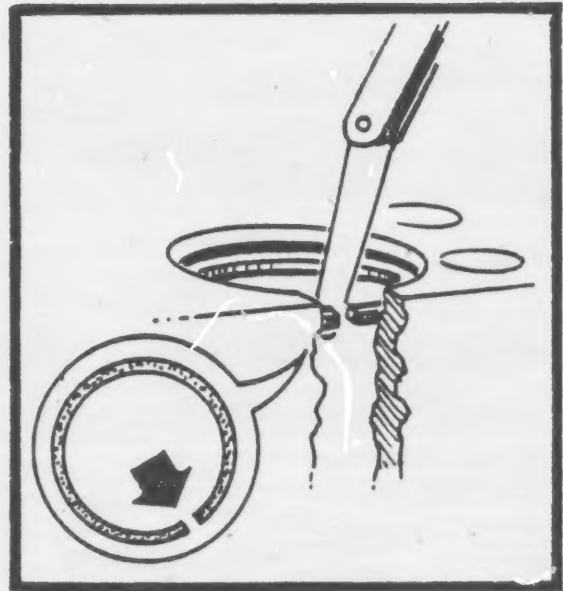
EXAMPLE: 2 INCH RING - .006 RING END GAP

2 1/2 INCH RING - .0075 RING END GAP

3 INCH RING - .009 RING END GAP

24. CHECK ALL THE NEW RINGS AS IN JOB STEP 23.

LOOK:



25. IF ALL THE RING END GAPS ARE O.K., CLEAN THE WHOLE ENGINE. IF THE RING END GAPS ARE WRONG, TELL YOUR INSTRUCTOR.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CLEANED THE RING GROOVES.
2. PUT ONE OF THE NEW RINGS INTO THE CYLINDER.
3. CHECKED THE RING END GAP FOR ALL THE NEW RINGS.
4. CLEANED THE WHOLE ENGINE.

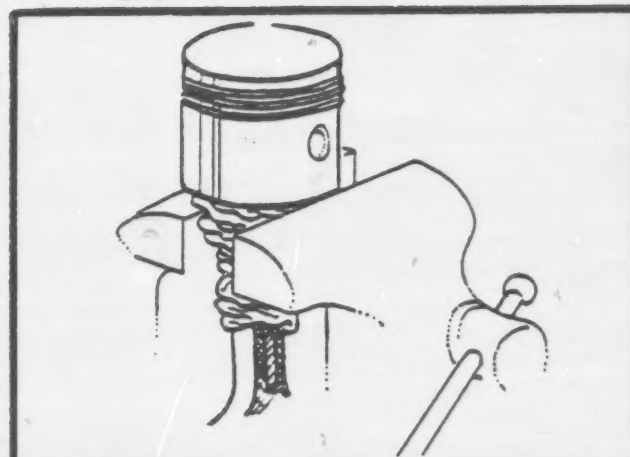
JOB STEPS

READ:

26. PUT THE PISTON ROD INTO A VICE. WRAP A RAG AROUND THE ROD AND CLAMP IT VERY TIGHTLY INTO THE VICE.



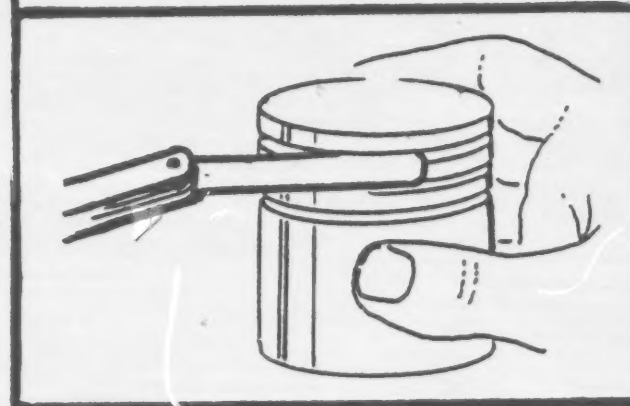
LOOK:



27. PUT THE NEW RINGS ON THE PISTON. CHECK WITH THE B. & S. MANUAL IV, (SECTION 9, PAGE 3, FIGURES 7 & 8) FOR THE RIGHT WAY TO PUT IN THE RINGS. BE VERY SURE THE RIGHT SIDE IS UP, OR THE ENGINE COULD BURN OIL.



28. READ THE B. & S. REPAIR MANUAL IV, SECTION 9, PAGE 2.



29. NOW CHECK THE RING LAND CLEARANCE BY PUTTING THE RIGHT FEELER GAUGE BETWEEN THE RING AND THE RING LAND. IF THE CLEARANCE IS O.K., GO ON WITH THE MOD. IF THE CLEARANCE IS MORE THAN THE MANUAL SAYS, THE PISTON WILL HAVE TO BE REPLACED. TELL YOUR INSTRUCTOR.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT IN THE NEW RINGS RIGHT.
2. CHECKED THE RING LAND CLEARANCE.

"TURN THE PAGE"



## WORD GUIDE

16

STAGGER - ONE HERE, ONE THERE, IN  
DIFFERENT POSITIONS

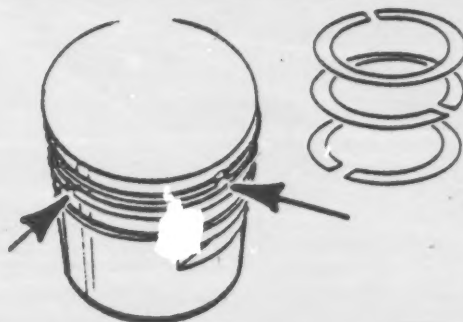
JOB STEPS

READ:

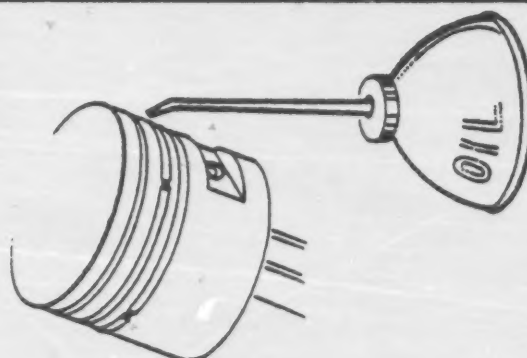
30. BE SURE TO STAGGER THE RING  
GAPS AROUND THE PISTON. THIS  
STOPS GAS AND OIL FROM GETTING  
PAST THE RINGS.



LOOK:



31. PUT A THIN COAT OF OIL ALL  
OVER THE RINGS AND PISTON SKIRT.



32. FIRST, READ B. & S. MANUAL IV,  
(SECTION 9, PAGE 3, FIGURE 8).  
READ PAGES 3 AND 4. THEN PUT THE  
RING COMPRESSOR ON THE PISTON AND  
RINGS.



WORD GUIDE

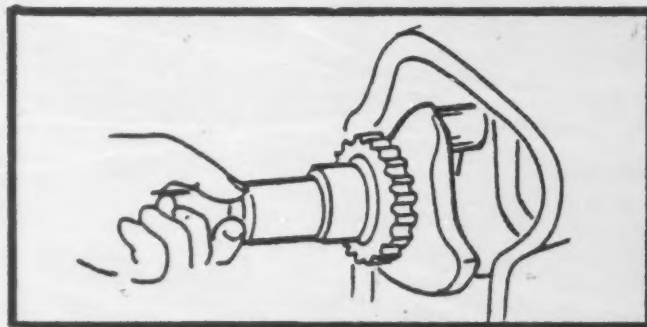
LUBE - GREASE, WAX, OR OIL USED  
TO MAKE PARTS SLIPPERY AND  
STOP WEAR

JOB STEPS

READ:

LOOK:

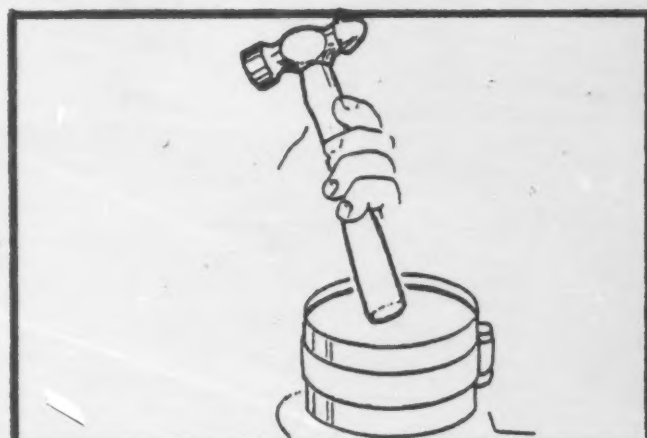
33. COAT THE CRANKSHAFT JOURNALS  
WITH ASSEMBLY LUBE OR LUBRIPLATE  
AND PUT THE CRANKSHAFT INTO  
THE BLOCK.



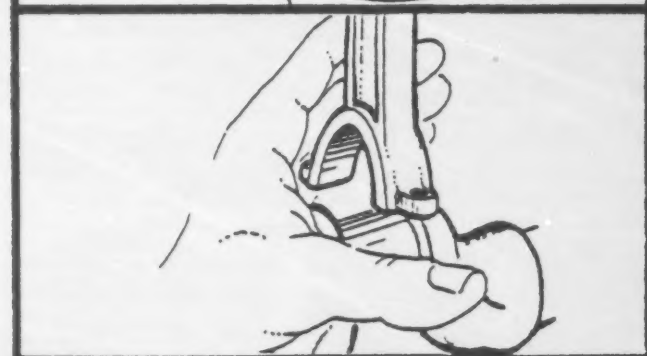
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. STAGGERED THE RING END GAPS.
2. OILED THE RINGS AND PISTON SKIRT.
3. READ THE B. & S. MANUAL FOR PUTTING IN  
OF RINGS AND PISTONS.
4. LUBRICATED AND PUT IN THE CRANKSHAFT.

34. NOW PUT THE PISTON AND ROD  
INTO THE CYLINDER. BE SURE THE  
ROD IS FACING THE RIGHT WAY.  
GENTLY TAP THE TOP OF THE PISTON  
WITH A HAMMER HANDLE. SEE THE  
B. & S. MANUAL IV (SECTION 9,  
PAGE 4, FIGURE 11).

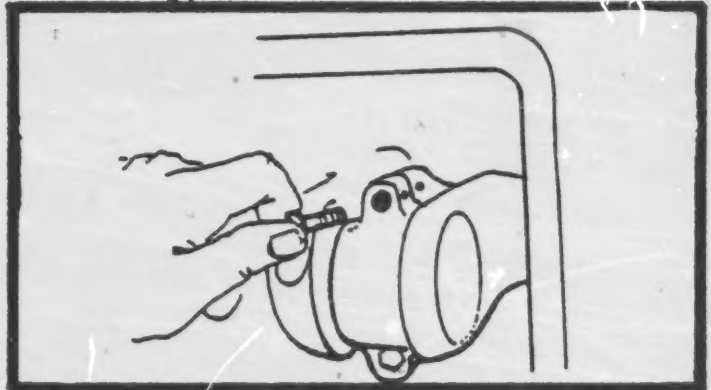


35. PUSH THE PISTON DOWN AND  
GUIDE THE ROD ONTO THE CRANK-  
SHAFT THROW.



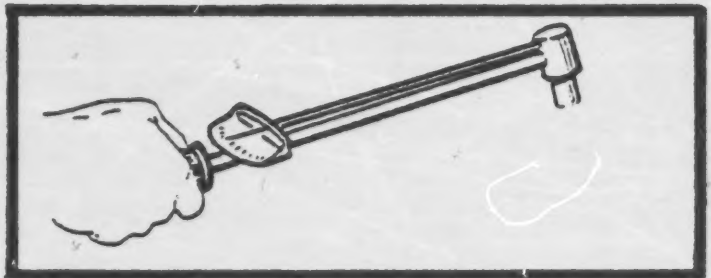
WORD GUIDETORQUE - TWISTING FORCE TO TIGHTENJOB STEPSREAD:

36. PUT THE ROD CAP ON SO THAT THE MATCH MARKS LINE UP. BE SURE TO PUT THE OIL SPLASHER ON (IF THERE IS ONE) BEFORE PUTTING ON THE ROD NUTS OR BOLTS. SEE THE B. & S. MANUAL IV (SECTION 9, PAGE 4, FIGURE 11).

LOOK:

37. TORQUE THE ROD BOLTS OR NUTS. CHECK THE MANUAL FOR GUIDELINES. BE SURE TO BEND THE ROD LOCK TO THE BOLT HEAD, IF ONE IS USED.

NOTE: SOMETIMES THE ROD BOLTS AND NUTS ARE CALLED CAP SCREWS.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT THE PISTON AND ROD INTO THE ENGINE BLOCK RIGHT.
2. MATCHED THE ROD CAP MARKS RIGHT.
3. TORQUED THE ROD BOLTS OR NUTS AND BENT THE LOCK, IF THERE WAS ONE.

38. IF YOU REMOVED THE CAMSHAFT AND LIFTERS, PUT THEM IN NOW.

"TURN THE PAGE"



JOB STEPS

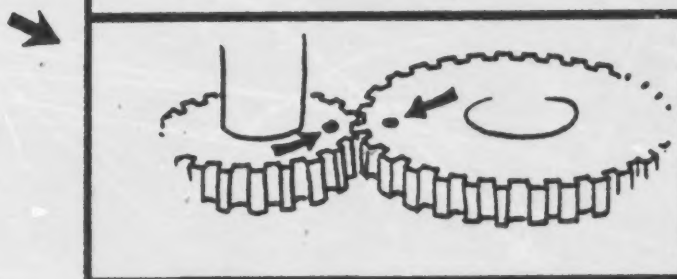
READ:

39. READ THE B. & S. MANUAL  
SECTION 10, PAGE 3.

LOOK:

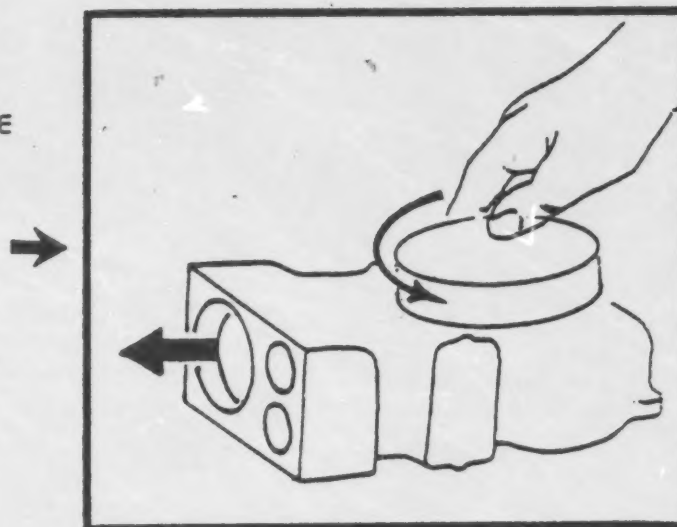


40. SET THE TIMING MARKS AND  
RE-TIME THE CRANK.



41. CHECK THE VALVE TO PISTON  
TIMING MARKS JUST IN CASE THE  
CAM OR THE CRANK IS TIMED WRONG.  
DO IT LIKE THIS:

- A. TURN THE CRANKSHAFT TO T.D.C. BETWEEN THE EXHAUST AND INTAKE STROKES.
- B. THE PISTON SHOULD REMAIN AT T.D.C. AND THE VALVES SHOULD BOTH NOT MOVE MUCH. IF THE VALVES DO NOT MOVE, YOU ARE ON THE COMPRESSION STROKE.
- C. MOVE THE CRANKSHAFT AROUND TO THE NEXT T.D.C. BE SURE BOTH VALVES MOVE AND THE PISTON DOES NOT (THIS PROVES THE PISTON AND VALVES ARE PROPERLY TIMED).



"TURN THE PAGE"

WORD GUIDE

LUBRICATE - USING LUBE TO MAKE  
MAKE PARTS SLIPPERY AND STOP  
WEAR

JOB STEPS

READ:

42. TAKE THE CRANKSHAFT SEAL OUT  
OF THE SUMP AND CLEAN OUT THE  
SUMP. SEE MOD 7501 01 001.

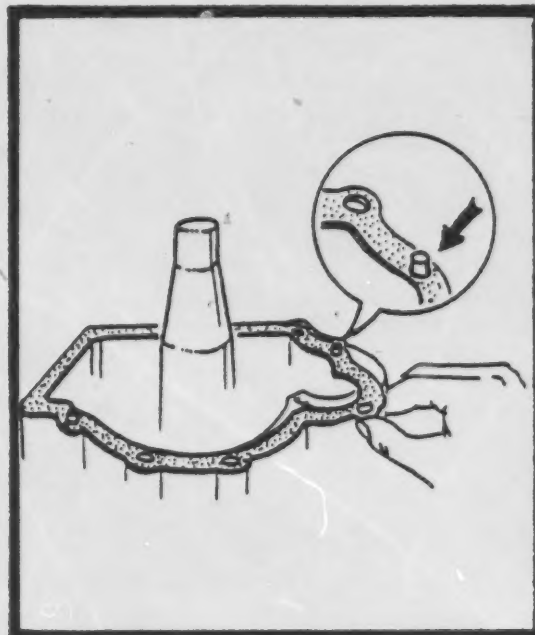
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT IN CAMSHAFT AND LIFTERS.
2. READ SECTION 10, PAGE 3 IN THE B. & S. MANUAL.
3. SET THE TIMING MARKS TO THE MANUAL GUIDELINES.
4. CHECKED THE VALVE TIMING AND IT IS RIGHT.
5. TAKEN THE CRANKSHAFT SUMP SEAL OUT AND  
CLEANED UP THE SUMP.

43. PUT THE NEW GASKET ON THE  
BLOCK. IF THE GASKET IS WRINKLED  
OR SHORT, SOAK IT A FEW MINUTES  
IN WARM WATER. BE SURE THE GASKET  
LIES FLAT AND THE DOWELS HOLD IT  
IN PLACE.



44. USE OIL OR LUBRIPLATE AND  
LUBRICATE THE CAMSHAFT BEARING  
AND THE CRANKSHAFT BEARINGS.

"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

45. PUT IN THE GOVERNOR OR THE OIL SLINGER NOW, IF THE ENGINE HAS ONE.

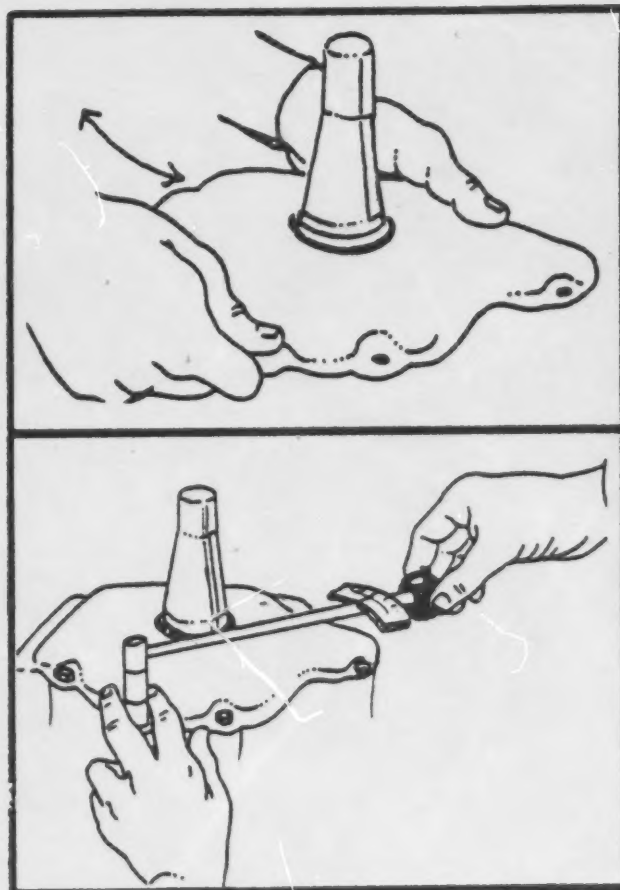
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT IN THE NEW GASKET ONTO THE BLOCK RIGHT.
2. LUBRICATED THE CAM AND CRANKSHAFT BEARINGS.
3. PUT IN THE GOVERNOR AND THE OIL SLINGER, IF THERE WAS ONE.

46. INSTALL THE SUMP ON THE CRANKSHAFT AND CAREFULLY PUSH DOWN THE SUMP.

- A. BE SURE TO SET THE CAMSHAFT WITH THE BEARING HOLE. NEVER FORCE THE SUMP DOWN. IF IT DOES NOT GO DOWN EASILY, CHECK WITH YOUR INSTRUCTOR.
- B. IF THE ENGINE IS A TECUMSEH, AND IT HAS A NYLON GOVERNOR GEAR, BE SURE THE GEAR WORKS WITH THE CAM GEAR. YOU MAY HAVE TO TURN THE CRANKSHAFT BACK AND FORTH A LITTLE BIT TO GET IT TO WORK.
- C. NOW GENTLY PUSH THE SUMP THE REST OF THE WAY DOWN.

47. PUT IN THE SUMP BOLTS AND TORQUE THEM DOWN. SEE THE B. & S. MANUAL.



"TURN THE PAGE"

JOB STEPS

READ:

48. PUT IN THE NEW OIL SEAL IN THE SUMP LIKE YOU DID IN MOD 7501 01 001.



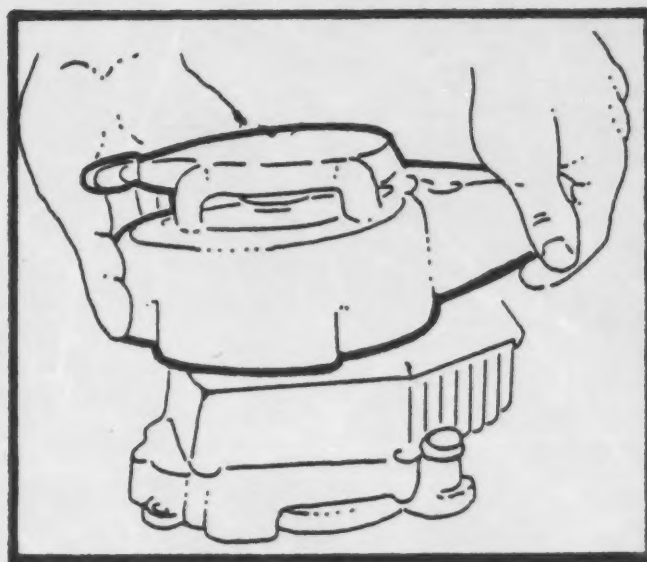
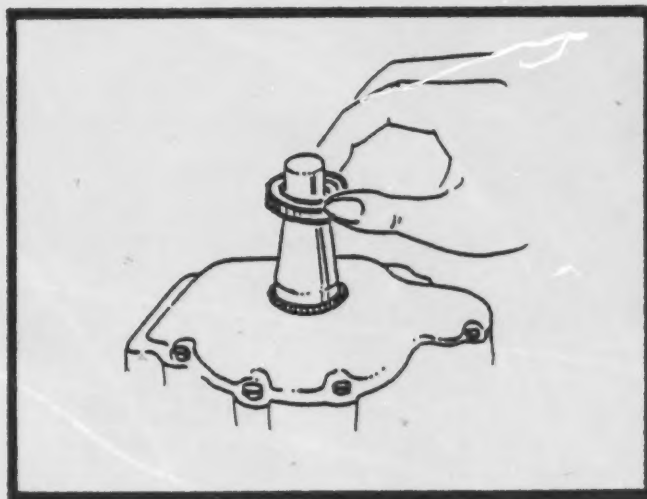
49. PUT A NEW HEAD GASKET ON THE BLOCK. SEE MOD 7501 01 003.

50. PUT THE HEAD ON, AND TORQUE IT. SEE THE MANUAL FOR THE ENGINE ON WHICH YOU ARE WORKING FOR THE TORQUE GUIDELINES.

51. PUT THE AIR HOUSING BACK ON.



LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT IN AND TORQUED THE SUMP BOLTS.
2. PUT THE NEW OIL SEAL IN RIGHT.
3. PUT IN THE NEW HEAD GASKET.
4. PUT ON AND TORQUED THE HEAD BOLTS AND HEAD.
5. PUT ON THE AIR HOUSING.

"TURN THE PAGE"

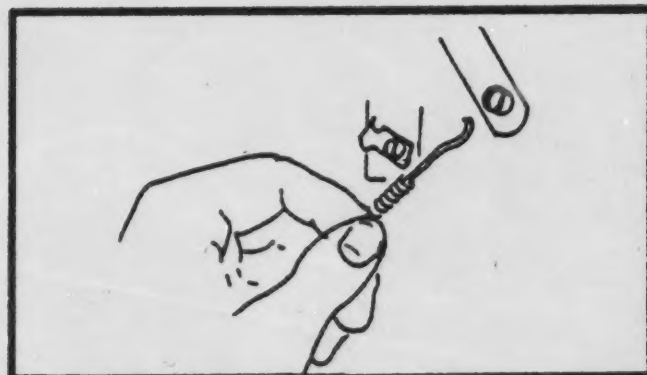
WORD GUIDEADJUST - SET UNTIL WORKING RIGHTJOB STEPS

READ:

LOOK:

52. FILL THE ENGINE WITH FUEL  
AND OIL.

53. ATTACH ALL CONTROLS --  
THROTTLE, GEAR DRIVES,  
BLADES, ETC.



54. START UP THE ENGINE. ADJUST  
IDLE, TIMING, ETC. AS NEEDED.



55. CHECK FOR OIL LEAKS, THEN  
SHUT OFF ENGINE.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. FILLED ENGINE WITH OIL AND FUEL.
2. ATTACHED ALL CONTROLS.
3. STARTED ENGINE.
4. CHECKED FOR OIL LEAKS

"TURN THE PAGE"



WORD GUIDE

CUSTOMER - PERSON FOR WHOM YOU DO  
THE JOB.

JOB STEPS

READ:

56. RE-TORQUE THE HEAD BOLTS.

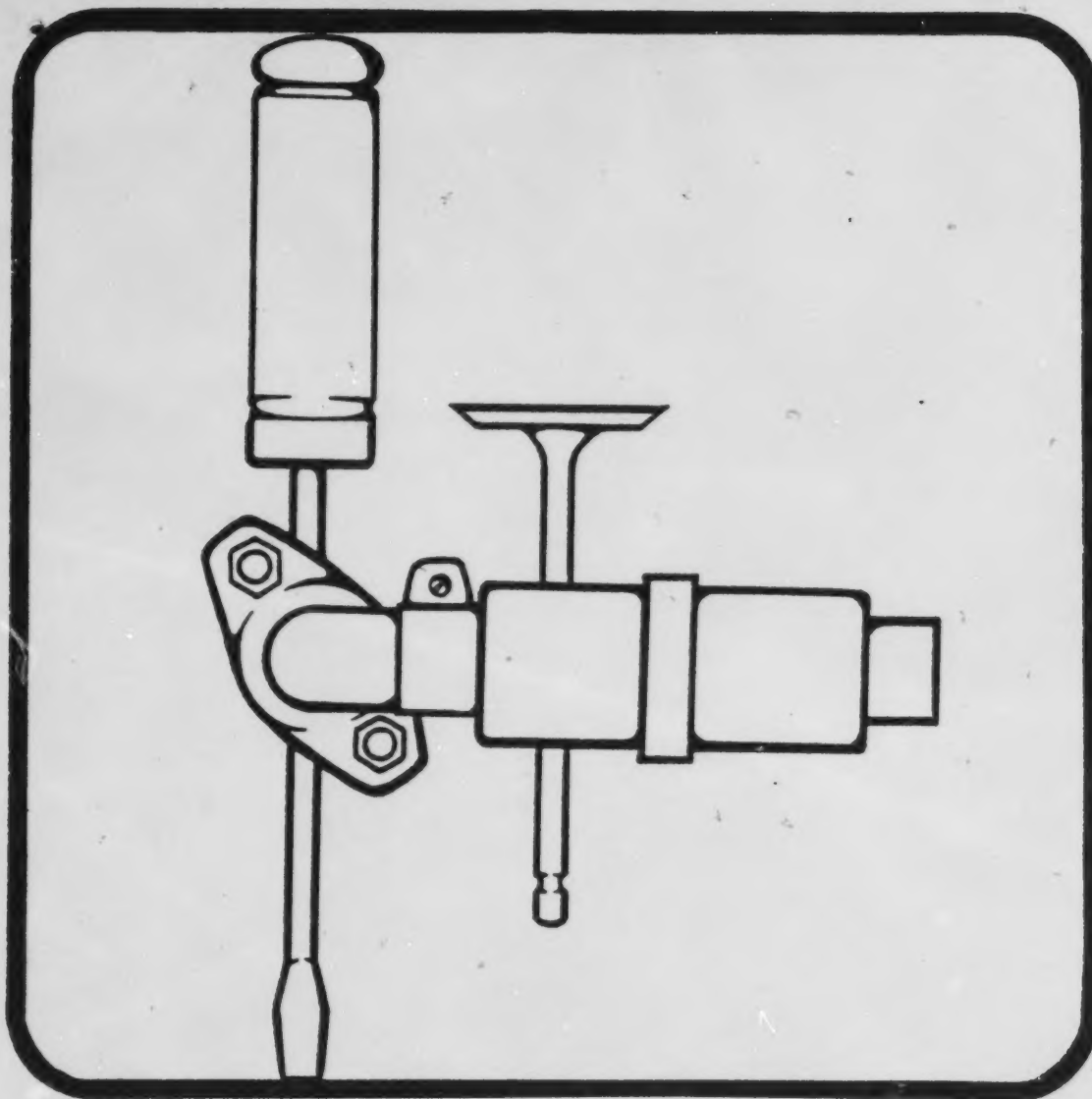
LOOK:

57. CLEAN UP THE ENGINE FOR THE  
CUSTOMER TO PICK UP.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. RE-TORQUED THE HEAD BOLTS.
2. CLEANED UP THE ENGINE FOR THE CUSTOMER.

ASK YOUR INSTRUCTOR TO START THE ENGINE AND CHECK  
HOW IT RUNS.



# small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 016 1 7501 01 016 3 date: 10/77 level:       

skill title: REMOVE AND REPLACE OIL SEAL POWER PRODUCTS,  
TWO-CYCLE ENGINE

developed & written by: A. STEINBERG

visuals by: DAVE WEHRWEIN

REMOVE - TAKE OFF

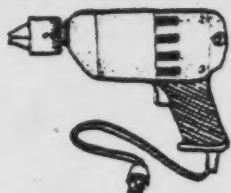
REPLACE - CHANGE OR PUT BACK

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

HOW TO REMOVE AND REPLACE THE LOWER OIL SEAL IN A  
POWER PRODUCTS ENGINE.

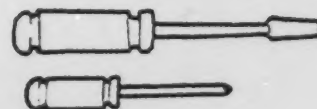
AND IN ORDER TO DO THIS YOU WILL NEED:



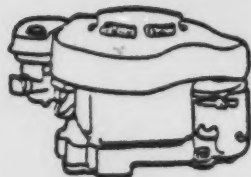
1/4" ELECTRIC DRILL



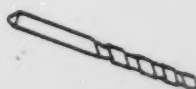
1/8" PUNCH



SCREWDRIVER SET



POWER PRODUCTS  
2-CYCLE ENGINE



DRILL INDEX  
SET



SEAL PICK



SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

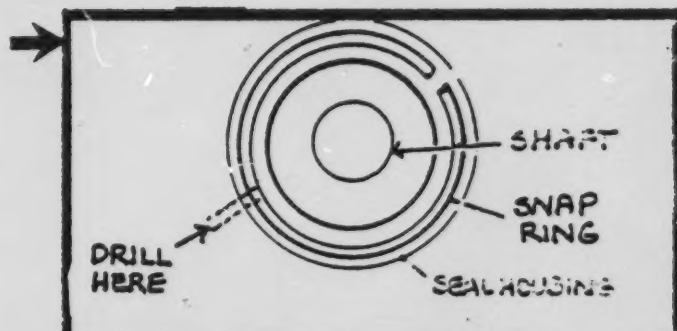
1. YOU HAVE ALL THE EQUIPMENT.
2. YOU HAVE REPLACED THE LOWER OIL SEAL IN A POWER PRODUCTS ENGINE SO IT DOES NOT LEAK.

WORD GUIDE

WISE - METAL GRIP WHICH HOLDS  
OTHER THINGS TIGHTLY BETWEEN  
ITS JAWS

JOB STEPSREAD:

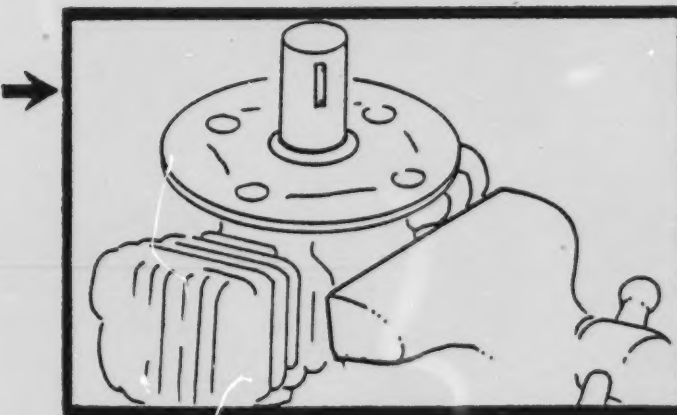
1. STUDY THE DRAWING AND BE  
SURE YOU CAN NAME ALL THE  
PARTS.

LOOK:

2. GET ALL EQUIPMENT AND TAKE  
IT TO YOUR WORK AREA.



3. CLAMP ENGINE UPSIDE-DOWN IN  
A VISE. HOLD THE ENGINE FIRMLY  
AND BE CAREFUL NOT TO BREAK OR  
DROP IT.



"TURN THE PAGE"

JOB STEPSREAD:

4. PUT ON YOUR SAFETY GLASSES.

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. STUDIED THE DRAWING AND LEARNED THE PARTS.
2. ALL EQUIPMENT.
3. CLAMPED ENGINE FIRMLY IN THE VISE.
4. PUT ON YOUR SAFETY GLASSES.

5. GET 1/8" DRILL BIT FROM DRILL INDEX AND PUT DRILL BIT INTO DRILL MOTOR.



6. CHECK THE DRAWING IN JOB STEP #1 TO BE SURE YOU KNOW WHERE YOU WANT TO PRICK PUNCH TO GET READY TO DRILL THE 1/8" HOLE. THE HOLE MUST GO IN TO THE SNAP RING.

"TURN THE PAGE"



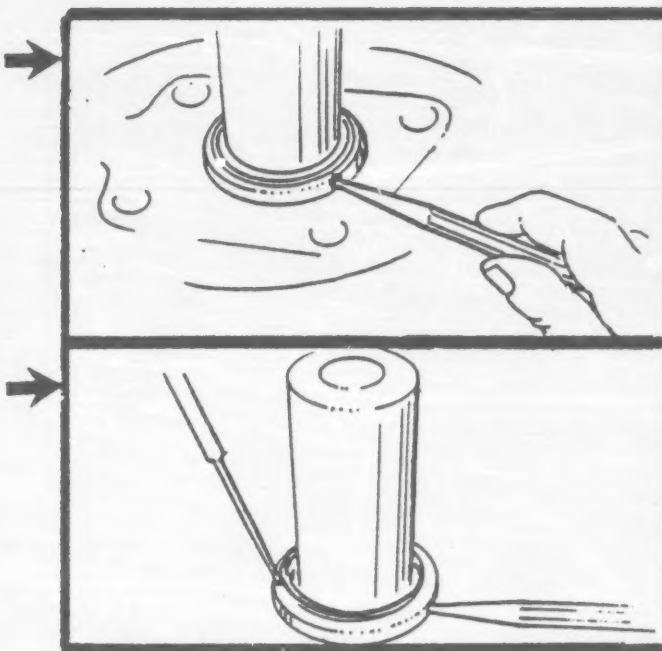
WORD GUIDE

RETAINER - HOLDS SOMETHING IN, OR  
BACK

JOB STEPSREAD:

7. AFTER DRILLING THE HOLE,  
PUSH THE PUNCH INTO THE HOLE  
TO TAKE OFF THE SNAP RING.

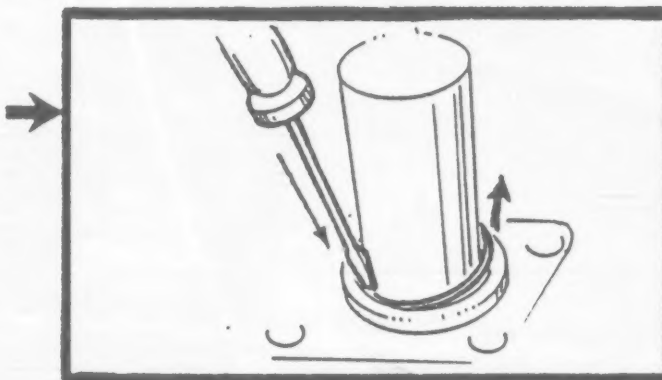
8. HOLD THE PUNCH IN AND USE  
THE SEAL PICK TO LIFT OUT THE  
SNAP RING.

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT 1/8" DRILL BIT INTO THE  
DRILL MOTOR.
2. CHECKED DRAWING SO YOU KNOW WHERE TO PRICK  
PUNCH.
3. PUSHED THE PUNCH INTO THE HOLE.
4. LIFTED OUT THE SNAP RING.

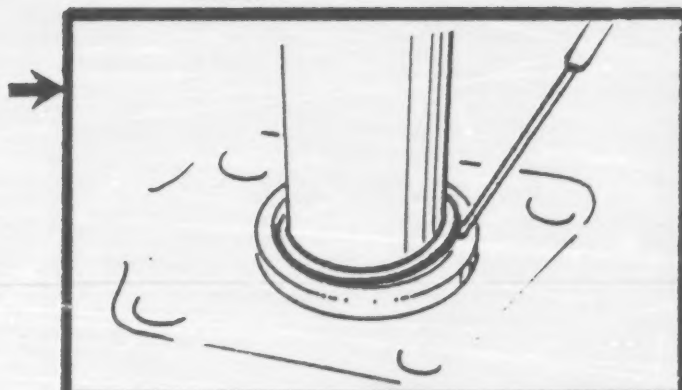
9. PUSH DOWN ON THE RETAINER  
RING WITH A SMALL SCREWDRIVER  
AND FORCE UP THE OTHER SIDE OF  
THE RING UNTIL YOU CAN TAKE OUT  
THE RETAINER RING.



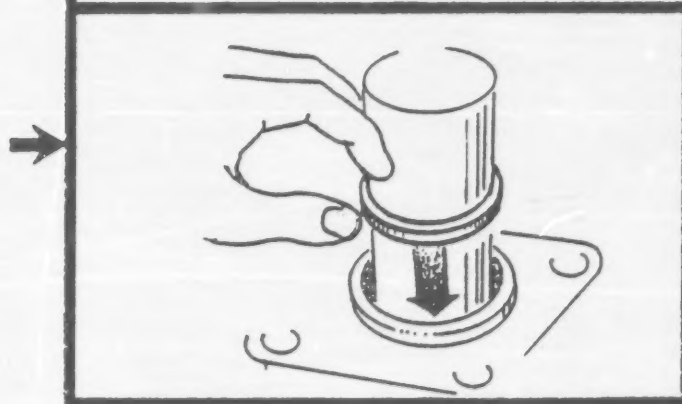
"TURN THE PAGE"

JOB STEPSREAD:

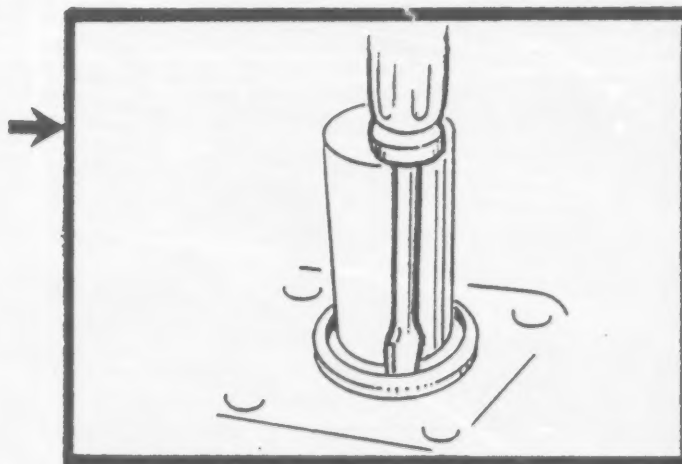
10. USING THE SEAL PICK, PULL THE SEAL OUT OF THE HOUSING, BEING CAREFUL NOT TO SCRATCH THE CRANKSHAFT.

LOOK:

11. PUT IN A NEW SEAL, MAKING SURE YOU HAVE PLACED IT IN THE RIGHT WAY.



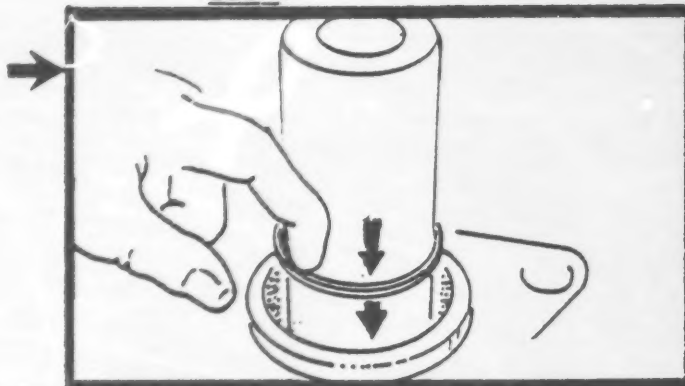
12. USING A SMALL SCREWDRIVER, PUSH THE SEAL DOWN ALL THE WAY.



"TURN THE PAGE"

JOB STEPSREAD:

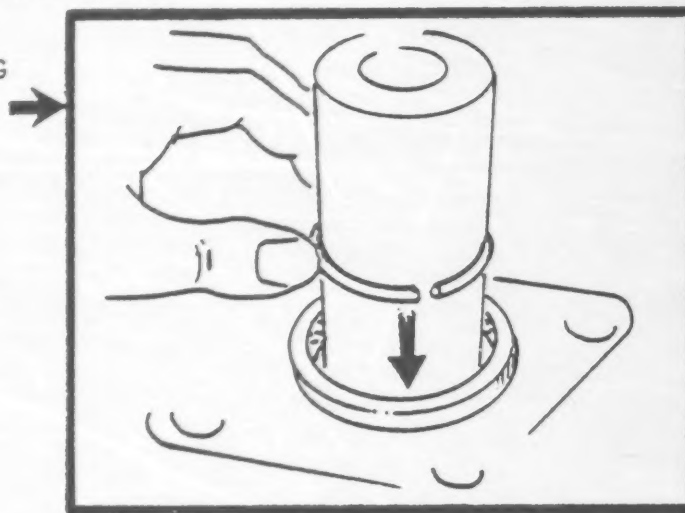
13. PUT IN THE RETAINER RING AND PUSH IT DOWN ALL THE WAY.

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OUT THE RETAINER RING.
2. PULLED THE SEAL OUT OF THE HOUSING WITHOUT SCRATCHING THE CRANKSHAFT.
3. PUT A NEW SEAL IN THE RIGHT WAY.
4. PUT IN A RETAINER RING.

14. PUT IN THE SNAP RING, MAKING SURE IT GOES ALL THE WAY INTO THE GROOVE.



15. FILL THE ENGINE WITH FUEL AND OIL MIX.

"TURN THE PAGE"

JOB STEPSREAD:LOOK:

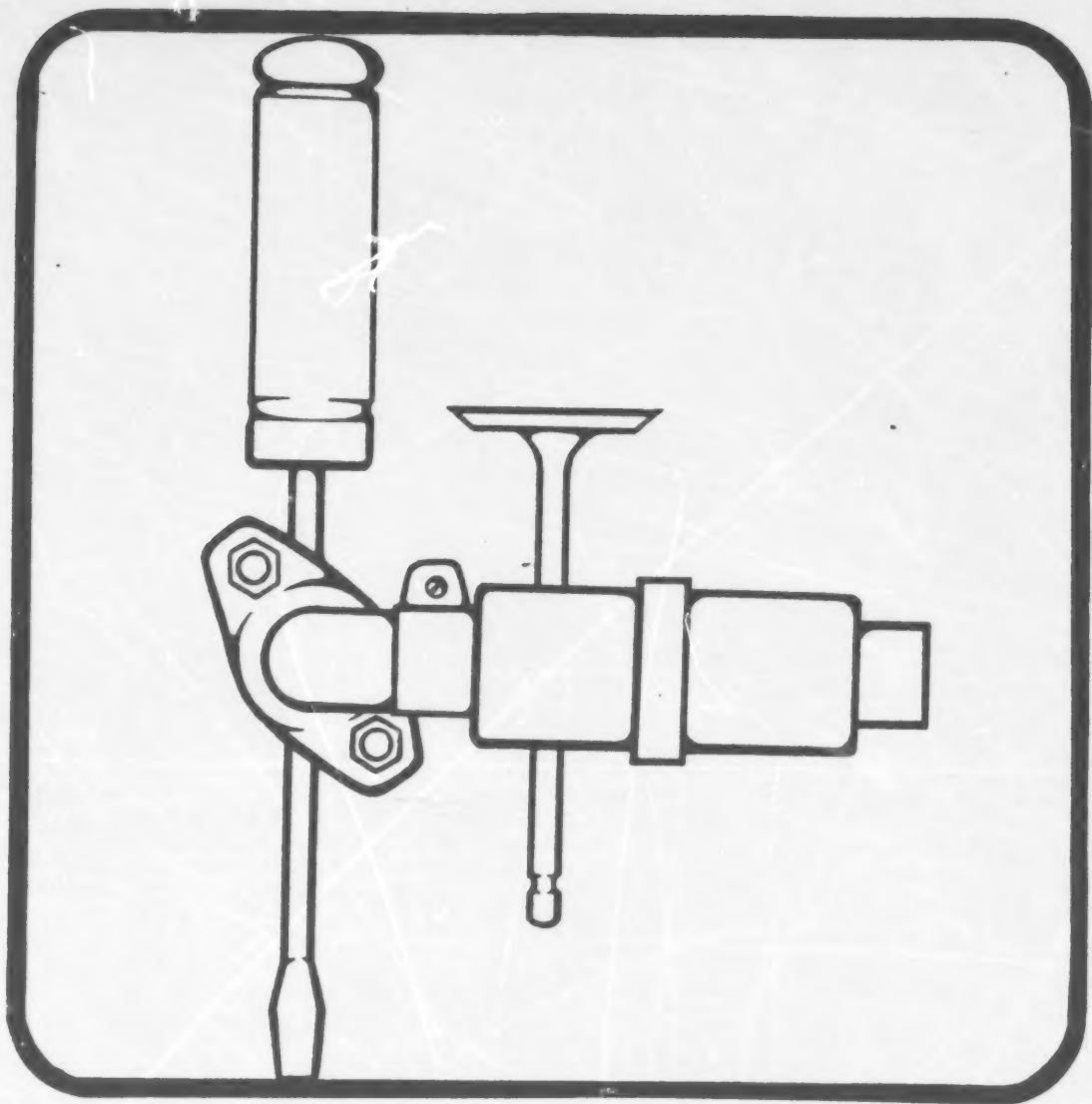
16. START THE ENGINE AND CHECK THAT IT WORKS RIGHT. FIX IT, IF NEEDED.



17. CHECK FOR OIL LEAKS.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT IN THE SNAP RING.
2. FILLED THE ENGINE WITH FUEL AND OIL MIX.
3. STARTED THE ENGINE AND CHECK IT.
4. CHECKED FOR OIL LEAKS.



## small engine repair

unit: SMALL ENGINE

capital area career center

module: 7501 01 017 1 7501 01 017 3 date: MAY 1978 level: 1

skill title: HOW TO CHECK CRANKSHAFT END PLAY

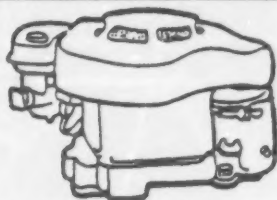
developed & written by: JACK HELDER

visuals by: DAVE WEHRWEIN



PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO CHECK END PLAY ON AN ENGINE CRANKSHAFT.

AND IN ORDER TO DO THIS YOU WILL NEED:

A 2- OR 4-CYCLE ENGINE



BRIGGS & STRATTON REPAIR MANUAL IV



DIAL INDICATOR KIT



HAND TOOLS



SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED ALL YOUR EQUIPMENT.
2. YOU HAVE MEASURED THE CRANKSHAFT END PLAY AND TOLD YOUR INSTRUCTOR WHAT IT IS.

"TURN THE PAGE"

JOB STEPS

READ:

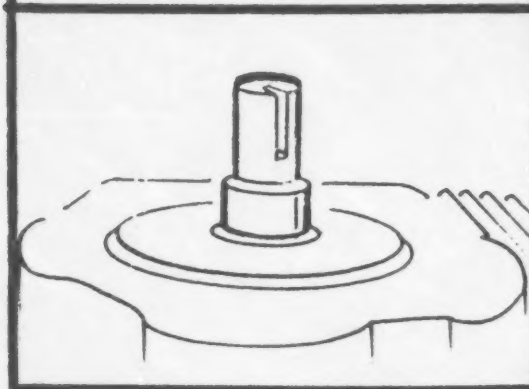
1. GET DISPLAY NUMBER II AND  
TAKE IT TO YOUR WORK AREA.  
WEAR YOUR SAFETY GLASSES.



LOOK:

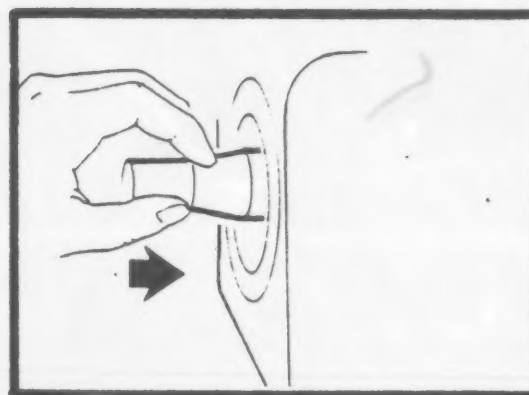


2. PUSH UP ON THE BOTTOM (PTO)  
END OF THE CRANKSHAFT, THEN PULL  
IT. THE MOVEMENT IS THE AMOUNT  
OF END PLAY.



CHECK: SHOW YOUR INSTRUCTOR THE MOVEMENT OF THE  
CRANKSHAFT THAT IS CALLED "END PLAY".

3. PUSH IN THE MAG END OF THE  
CRANKSHAFT. BE SURE IT IS ALL  
THE WAY IN.



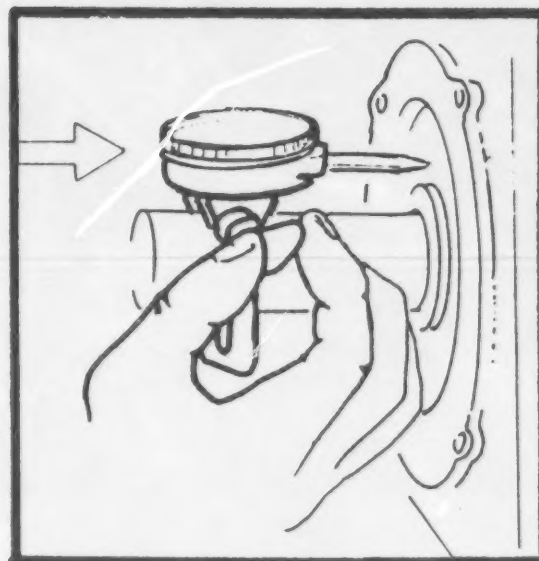
"TURN THE PAGE"

JOB STEPS

READ:

4. PUT THE END PLAY GAUGE KIT  
ON THE PTO END OF THE CRANKSHAFT. ➔

LOOK:



5. SLIDE THE GAUGE KIT ALONG THE  
CRANKSHAFT END UNTIL THE POINTED  
END TOUCHES THE SIDE OF THE ENGINE. ➔

6. TIGHTEN ON THE CLAMP.

"TURN THE PAGE"

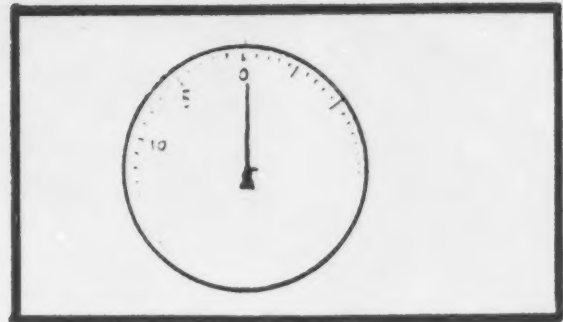
JOB STEPS

READ:

7. NOW "0" (ZERO) THE INDICATOR.  
THE GAUGE NEEDLE MUST BE ON "0"  
AND THE POINTER MUST JUST TOUCH  
THE SIDE OF THE ENGINE.



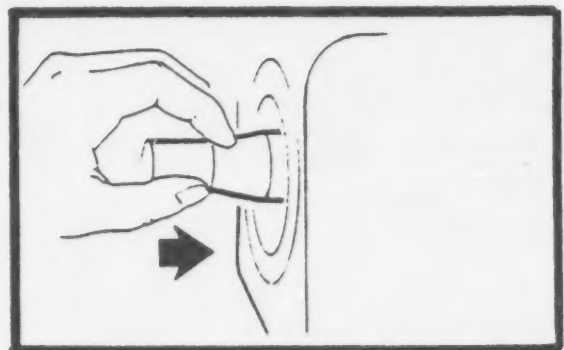
LOOK:



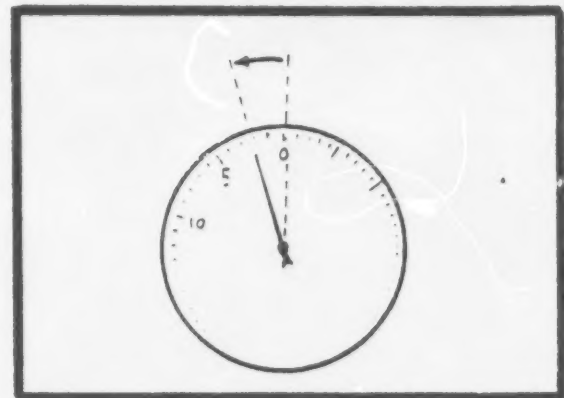
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUSHED THE PTO END IN.
2. ZEROED THE INDICATOR.

8. NOW PUSH IN THE MAG END ALL  
THE WAY TOWARD THE PTO END.



9. COUNT HOW MANY THOUSANDTHS OF  
AN INCH THE NEEDLE HAS MOVED  
(.001 EQUALS ONE THOUSANDTH).  
THIS IS THE AMOUNT OF END PLAY.



"TURN THE PAGE"

JOB STEPS

READ:

10. TELL YOUR INSTRUCTOR THE AMOUNT  
OF END PLAY. →

LOOK:

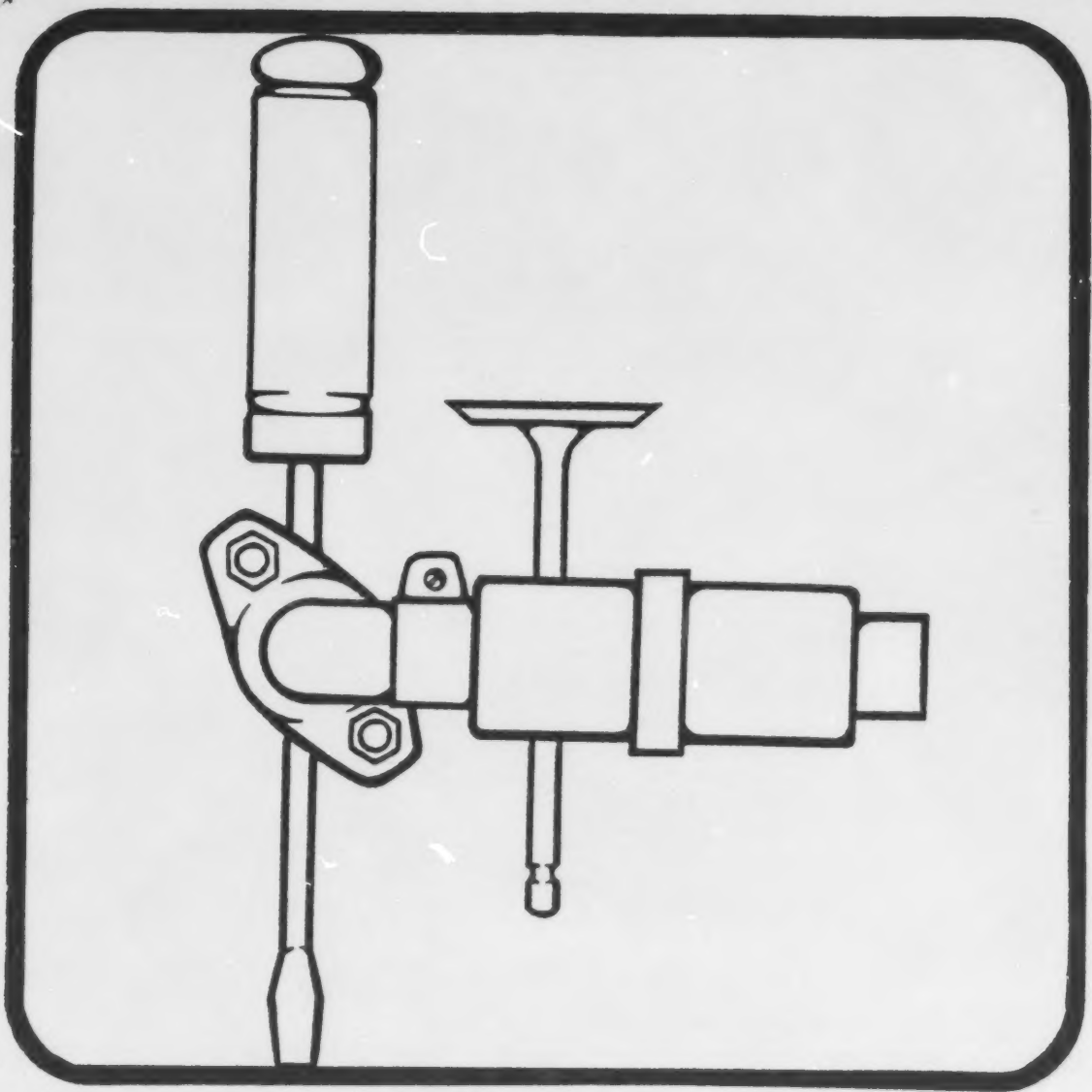


11. PUT AWAY YOUR EQUIPMENT.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TOLD THE AMOUNT OF END PLAY.
2. PUT AWAY YOUR EQUIPMENT.





## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 021 1 7501 01 021 3 date: MARCH 1978 level: I

skill title: REMOVE AND REPLACE CRANKSHAFT

developed & written by: JACK HELDER

visuals by: DAVE WEHRWEIN & BRUCE BENNETT

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REMOVE AND REPLACE THE CRANKSHAFT ON A BRIGGS AND STRATTON 92000 SERIES ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:

A BRIGGS AND STRATTON 92000 SERIES ENGINE  
HAND TOOLS

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU GATHER YOUR EQUIPMENT.
2. YOU FOLLOW THE JOB STEPS TO REMOVE AND REPLACE THE CRANKSHAFT.
3. YOU ARE SURE THAT THE CRANKSHAFT TURNS SMOOTHLY AND ALL PARTS WORK WELL.

"TURN THE PAGE"

JOB STEPS

READ:

1. TAKE YOUR EQUIPMENT TO  
YOUR WORK AREA.



LOOK:

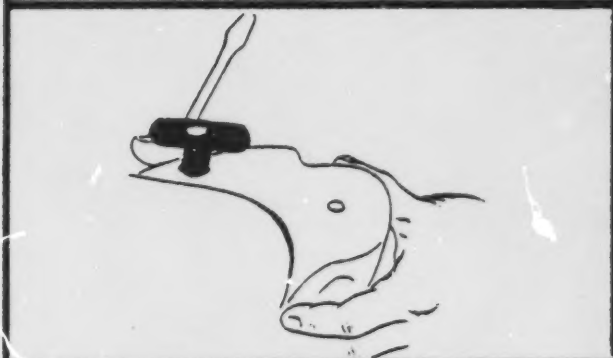


2. DRAIN THE GAS AND OIL.

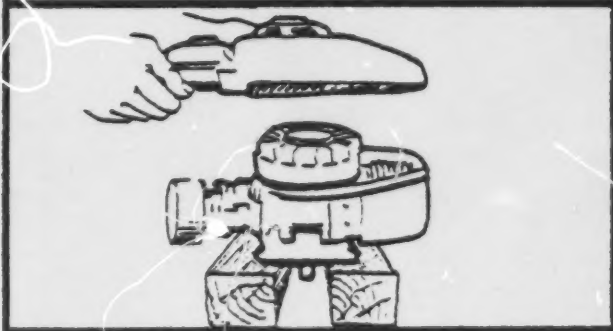


3. REMOVE THE STARTER  
ASSEMBLY.

A. SIDE MOUNTED TYPE.



B. TYPE THAT IS PART OF AIR  
HOUSING, REMOVE THE AIR  
HOUSING.



"TURN THE PAGE"

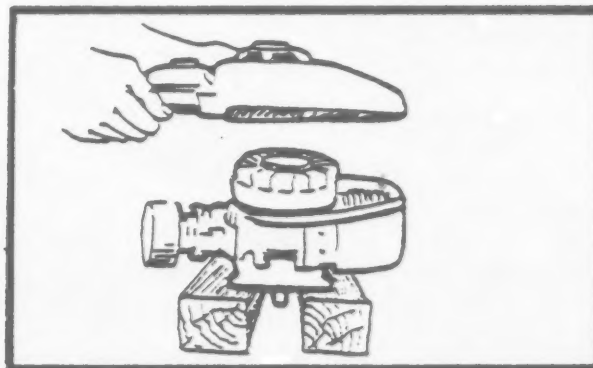
JOB STEPS

READ:

4. REMOVE THE AIR HOUSING  
IF YOU DID NOT DO IT IN  
STEP 3.



LOOK:

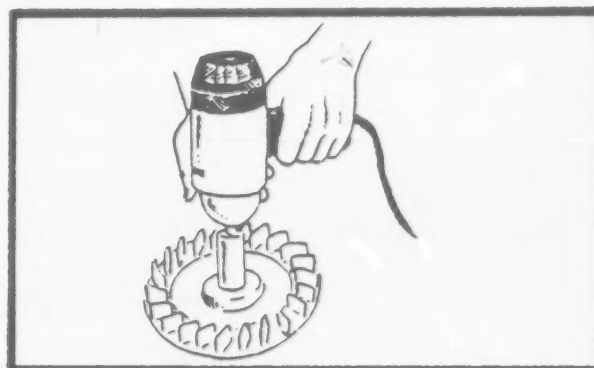


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

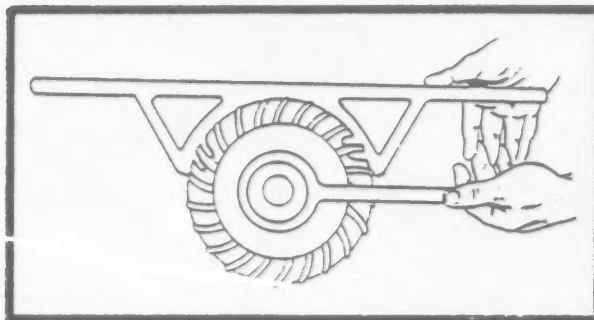
1. ALL YOUR EQUIPMENT.
2. DRAINED ALL GAS AND OIL.
3. REMOVED THE STARTER ASSEMBLY AND AIR HOUSING.

5. REMOVE THE FLYWHEEL NUT.

A. USE AN ELECTRIC IMPACT  
WRENCH, OR



B. IF THE FLYWHEEL IS HELD  
ON WITH A STARTER CLUTCH,  
REMOVE IT WITH A CLUTCH  
WRENCH AND FLYWHEEL HOLDER.

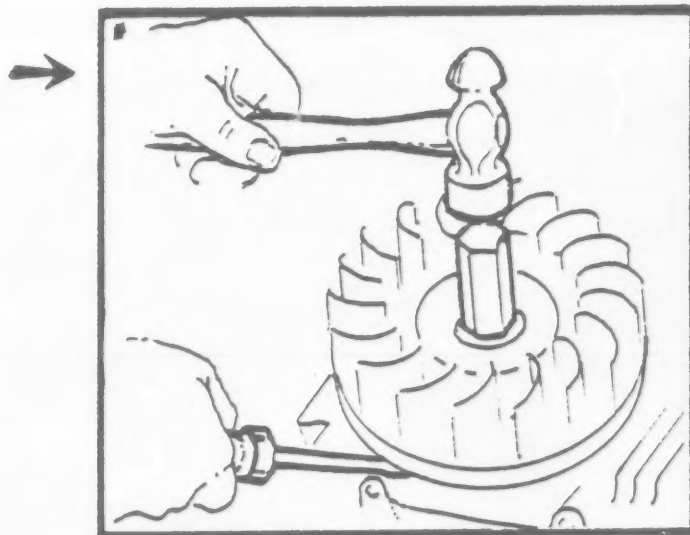


JOB STEPS

READ:

6. REMOVE THE FLYWHEEL USING A FLYWHEEL KNOCKER OR BRIGGS AND STRATTON PULLER (THE KNOCKER IS FASTER).

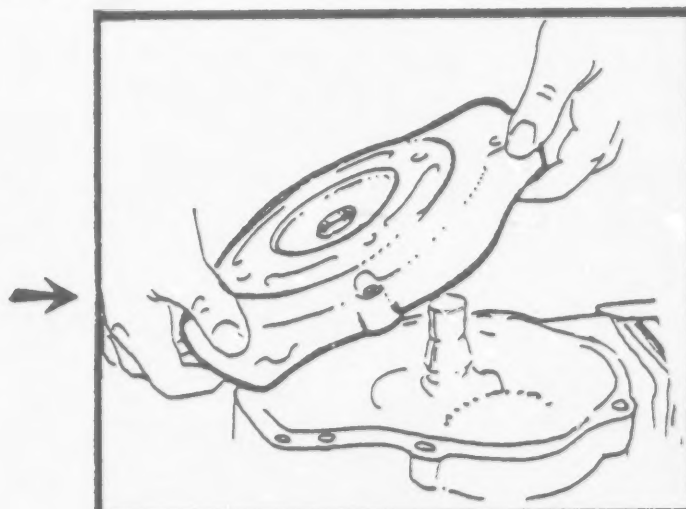
LOOK:



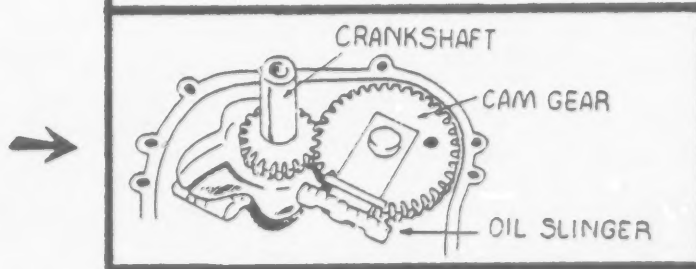
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE FLYWHEEL NUT.
2. REMOVED THE FLYWHEEL.

7. REMOVE THE SUMP.



8. REMOVE THE OIL SLINGER, CAM GEAR AND VALVES.



"TURN THE PAGE"



JOB STEPS

READ:

9. BEND BACK THE ROD BOLT  
LOCKS.



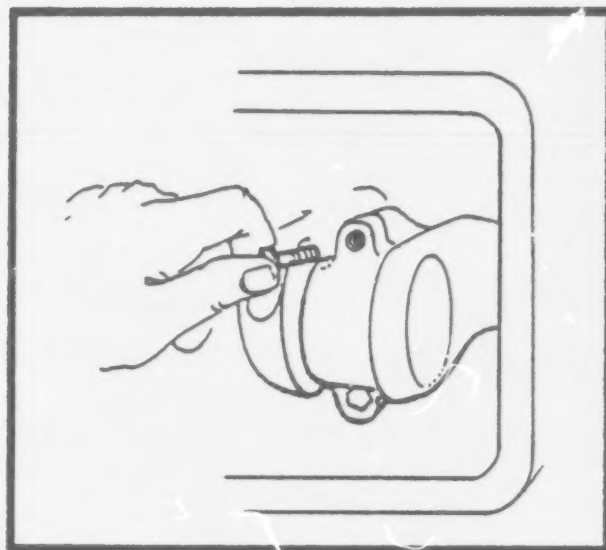
LOOK:



10. REMOVE THE ROD BOLTS.



11. REMOVE THE ROD CAP.



"TURN THE PAGE"

WORD GUIDE

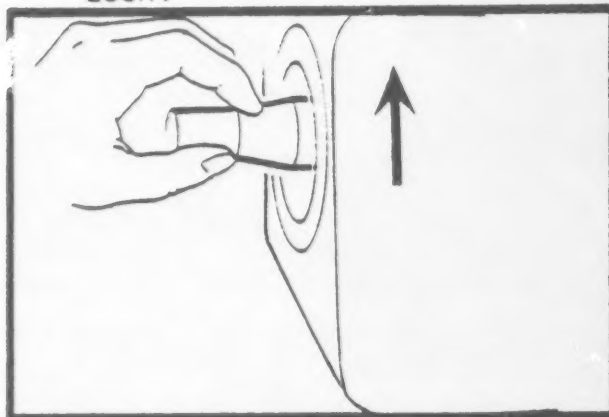
TOP DEAD CENTER - TDC, WHERE PISTON  
IS AT HIGHEST POINT.

JOB STEPS

READ:

12. ROTATE THE CRANKSHAFT SO  
THE PISTON IS AT TOP DEAD  
CENTER (TDC).

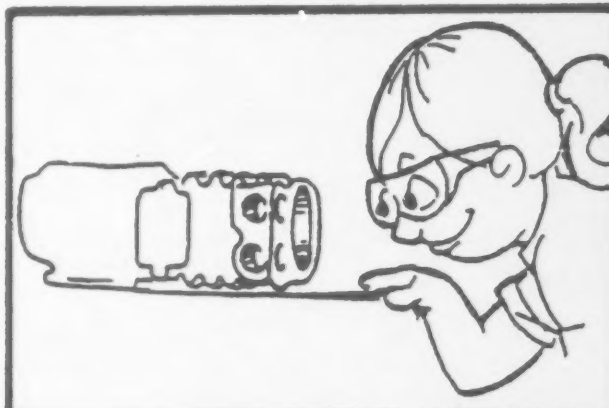
LOOK:



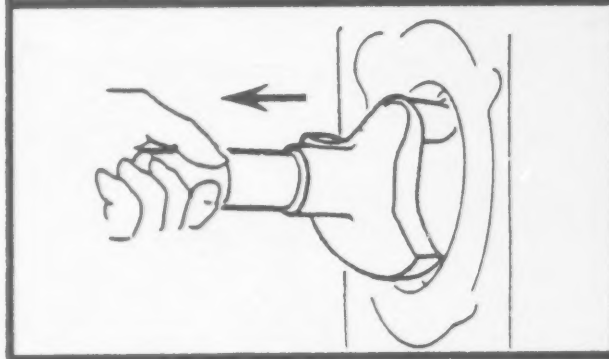
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE SUMP.
2. REMOVED THE OIL SLINGER, CAM GEAR AND VALVES.
3. REMOVED THE ROD CAP.
4. ROTATED THE CRANKSHAFT SO THAT PISTON IS AT TDC.

13. TURN THE BLOCK SO THE  
ROD LAYS DOWN AGAINST THE  
BLOCK.



14. TURN THE CRANKSHAFT  
AND GENTLY PULL THE  
CRANKSHAFT OUT OF THE ENGINE.



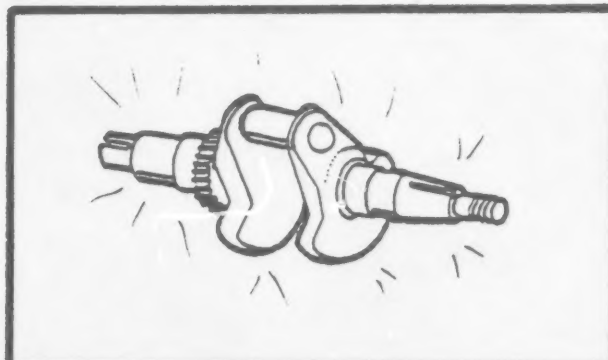
JOB STEPS

READ:

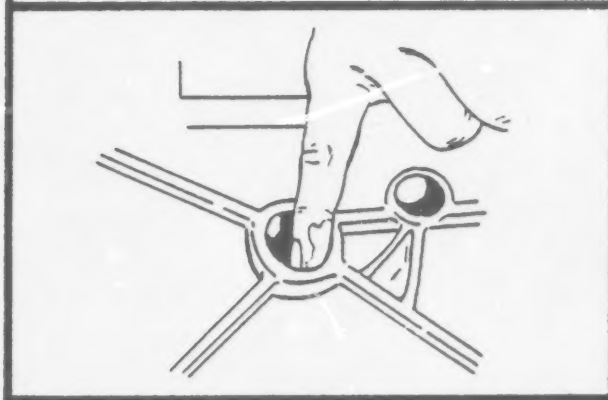
15. CLEAN THE NEW CRANKSHAFT  
SO THAT IT CAN BE INSTALLED.



LOOK:



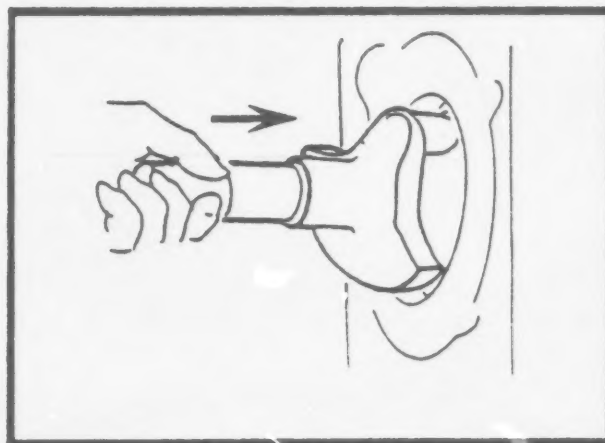
16. PUT GREASE OR OIL ON THE  
MAG SIDE MAIN BEARING.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE CRANKSHAFT.
2. CLEANED THE CRANKSHAFT AND PUT GREASE ON  
MAG SIDE MAIN BEARING.

17. LINE UP THE CRANKSHAFT  
AND CAREFULLY SLIDE IT  
BACK INTO THE ENGINE BLOCK.



"TURN THE PAGE"

WORD GUIDE

PRY - PUSH WITH A LONG OBJECT.

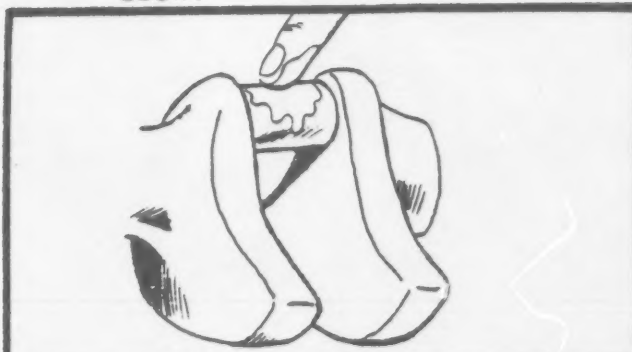
JOB STEPS

READ:

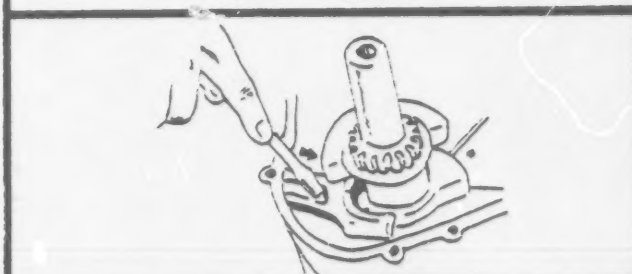
18. PUT OIL OR GREASE ON THE  
ROD BEARING JOURNAL.



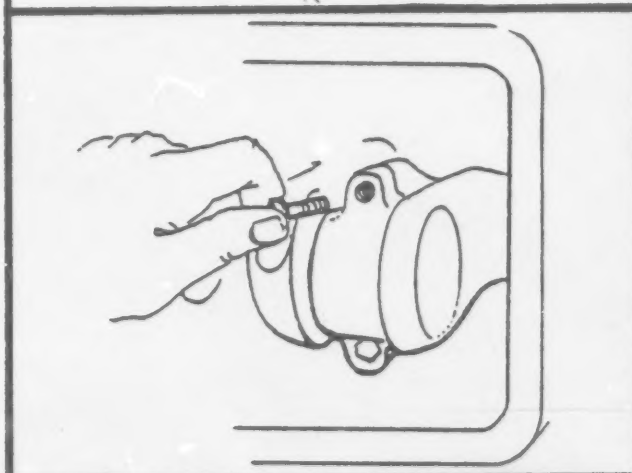
LOOK:



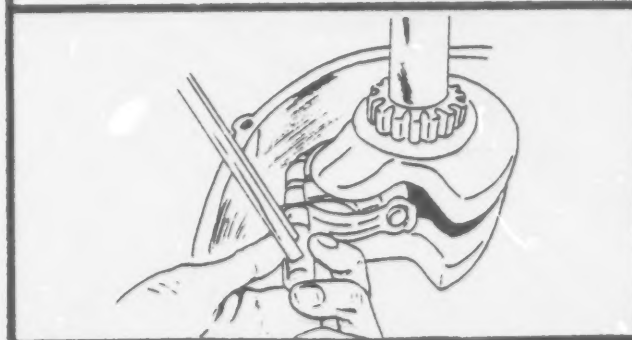
19. PRY THE ROD DOWN TO THE  
CRANKSHAFT. USE A SCREWDRIVER.



20. INSTALL THE ROD CAP, ROD  
BOLT LOCKS AND ROD BOLTS.



21. TIGHTEN AND TORQUE THE  
ROD BOLTS.



"TURN THE PAGE"

JOB STEPS

READ:

22. BEND DOWN THE ROD BOLT LOCKS.

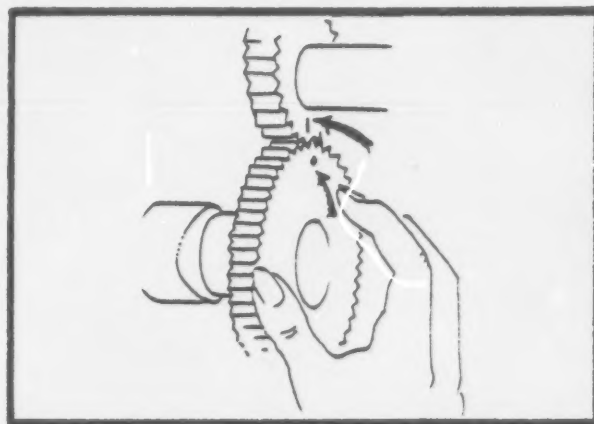
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. INSTALLED THE ROD CAP, ROD BOLT LOCKS AND ROD BOLTS.
2. BENT UP THE ROD BOLT LOCKS.

23. ROTATE THE CRANKSHAFT SO THE MARK ON THE CRANKSHAFT WILL LINE UP WITH THE CAM GEAR.



24. INSTALL THE CAM GEAR SO THE TIMING MARK LINES UP WITH THE MARK ON THE CRANKSHAFT.



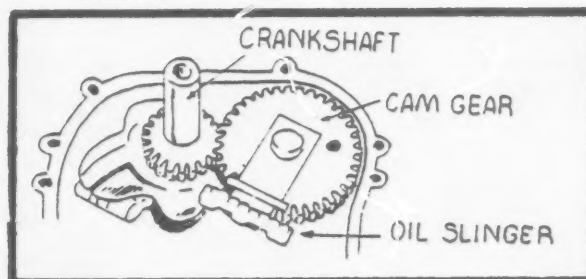
JOB STEPS

READ:

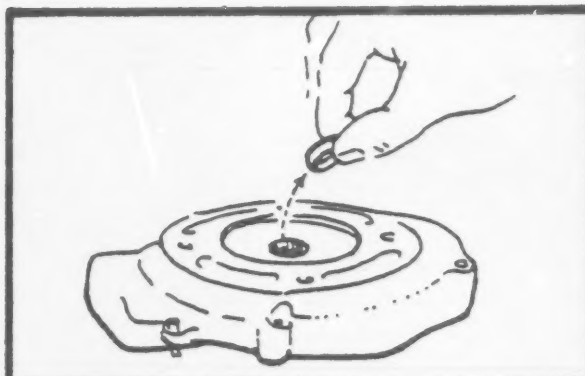
25. INSTALL THE OIL SLINGER  
ON THE CAM GEAR.



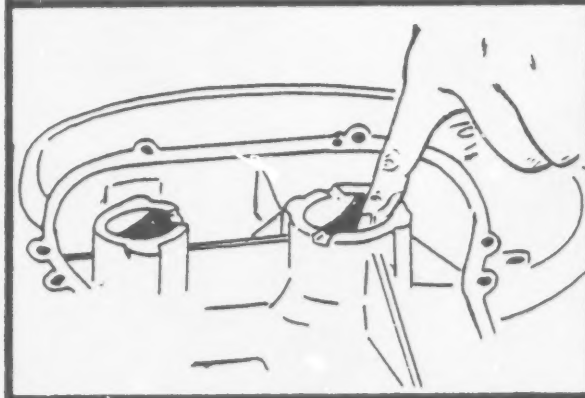
LOOK:



26. REMOVE THE OIL SEAL FROM  
THE SUMP.



27. OIL OR GREASE THE SUMP  
MAIN BEARING AND THE CAMSHAFT  
BEARING.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. INSTALLED THE CAM GEAR SO IT LINES UP WITH THE CRANKSHAFT TIMING MARK.
2. INSTALLED THE OIL SLINGER.
3. REMOVED THE SUMP OIL SEAL.
4. OILED OR GREASED THE SUMP MAIN BEARING AND CRANKSHAFT BEARING.

"TURN THE PAGE"

JOB STEPS

READ:

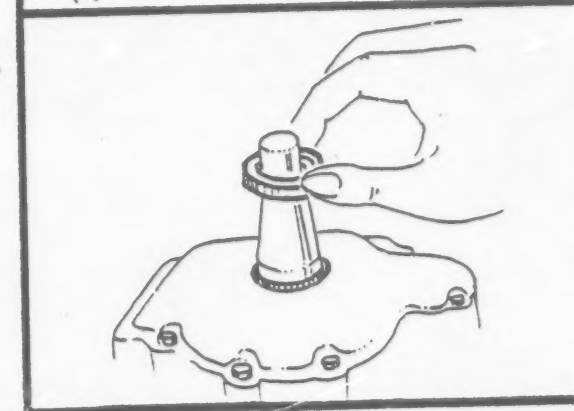
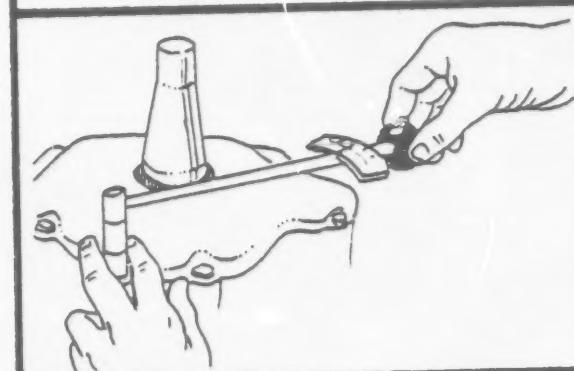
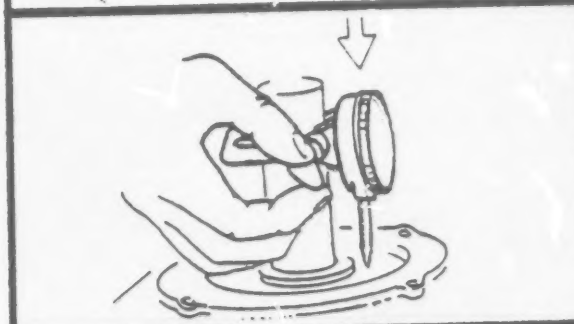
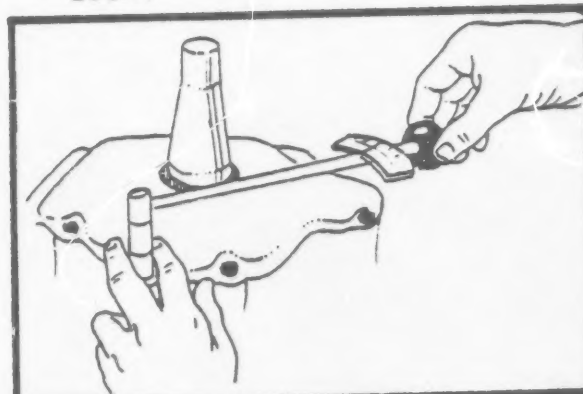
28. INSTALL THE SUMP. TIGHTEN  
TWO BOLTS TO 65 INCH POUNDS.

29. CHECK END PLAY AND  
ADJUST IF NEEDED.

30. INSTALL THE OTHER SUMP  
BOLTS AND TORQUE.

31. INSTALL THE OIL SEAL IN  
THE SUMP.

LOOK:

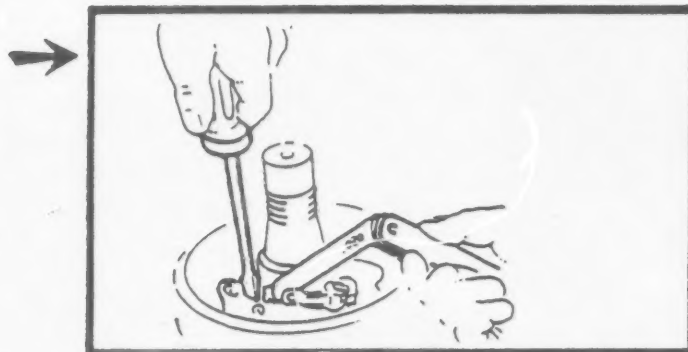


JOB STEPS

READ:

32. TURN THE BLOCK OVER,  
THEN CLEAN AND GAP THE  
POINTS.

LOOK:

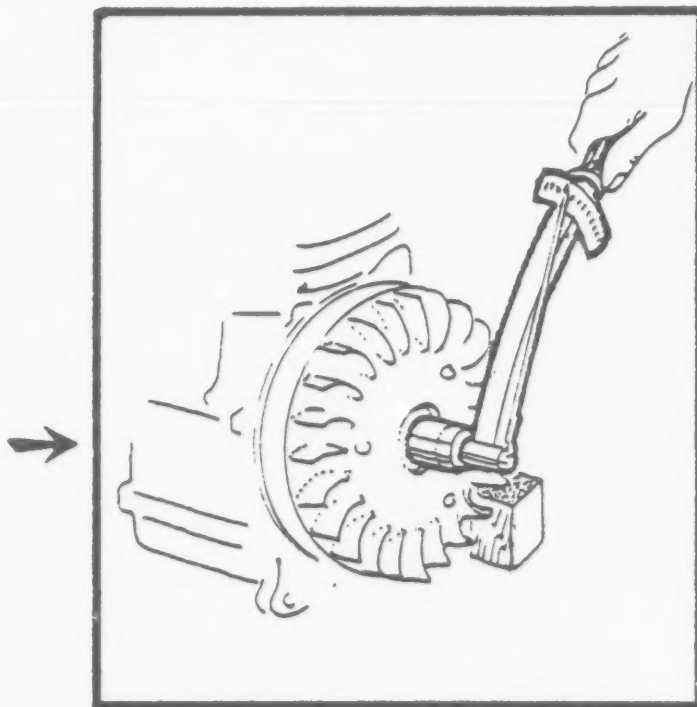


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. INSTALLED THE SUMP.
2. CHECKED END-PLAY AND ADJUSTED IF NEEDED.
3. INSTALLED THE OIL SEAL.
4. CLEANED AND GAPPED THE POINTS.

33. INSTALL THE POINT COVER.

34. INSTALL THE FLYWHEEL AND  
TORQUE IT.



"TURN THE PAGE"

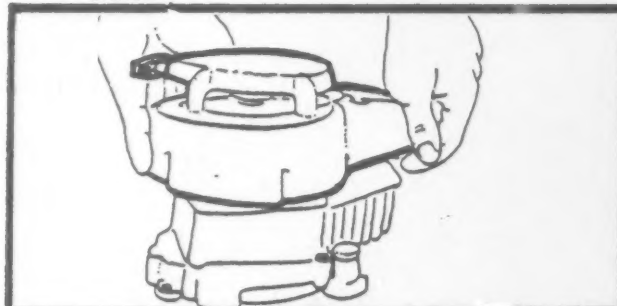
JOB STEPS

READ:

35. INSTALL THE AIR HOUSING  
(ALSO THE STARTER, IF  
TOGETHER).



LOOK:



36. INSTALL THE STARTER.



37. FILL THE ENGINE WITH  
OIL.



38. PUT SOME GAS IN THE  
TANK.



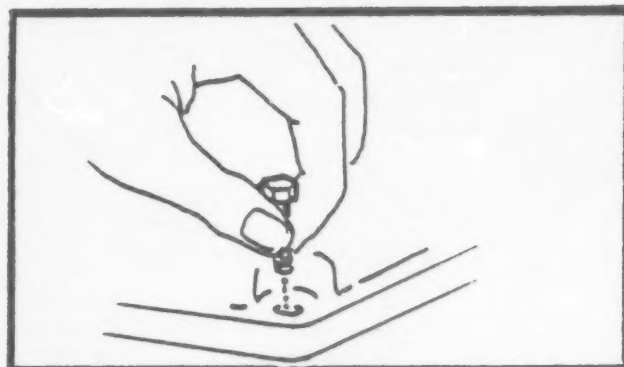
"TURN THE PAGE"

JOB STEPS

READ:

39. BOLT DOWN THE ENGINE TO THE BENCH OR MOWER DECK.

LOOK:



CHECK: HAVE YOUR INSTRUCTOR CHECK THAT THE ENGINE IS PUT TOGETHER AND READY TO TEST.

40. START AND ADJUST THE ENGINE.

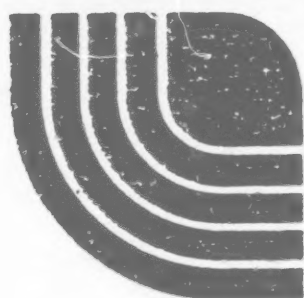


CHECK: HAVE YOUR INSTRUCTOR CHECK YOUR WORK.

41. CLEAN UP ALL TOOLS AND YOUR WORK AREA.







## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 022 1  
7501 01 022 3 date: 10/77 level: I

skill title: INSPECT AND MIKE CRANKSHAFT OF A 2- OR 4-CYCLE ENGINE

developed & written by: DWIGHT SMITH

visuals by: DAVE WEHRWEIN

WORD GUIDE

JOURNALS - THE BEARING AREA OF A CRANKSHAFT; WHERE THE LOAD ON THE ENGINE IS

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

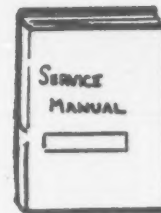
1. HOW TO INSPECT A CRANKSHAFT AND FIND OUT IF IT IS DAMAGED OR WORN.
2. HOW TO MEASURE THE JOURNALS TO SEE IF THEY ARE WORN.

AND IN ORDER TO DO THIS YOU WILL NEED:

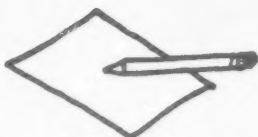
CRANKSHAFT FROM A SMALL ENGINE



MICROMETER



REPAIR MANUAL FOR ENGINE THAT CRANKSHAFT IS FROM



PAPER AND PENCIL

WE WILL KNOW THAT YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED THE EQUIPMENT FOR THIS MOD.
2. YOU HAVE MEASURED THE CRANKSHAFT JOURNALS AND CHECKED THEM AGAINST THE GUIDELINES.
3. YOU CAN SHOW DAMAGED PARTS TO YOUR INSTRUCTOR.
4. YOU HAVE PUT AWAY ALL EQUIPMENT AND CLEANED UP THE WORK AREA.

"TURN THE PAGE"

JOB STEPS

## READ:

1. GATHER ALL EQUIPMENT AND MATERIALS AND TAKE THEM TO YOUR WORK AREA.

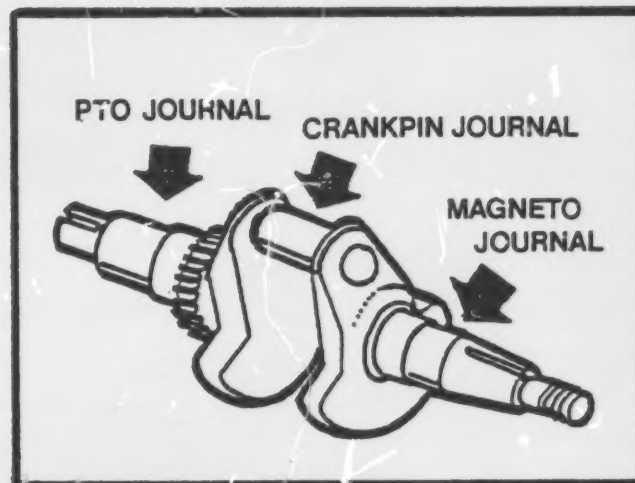
2. IN THE REPAIR MANUAL FOR THE ENGINE ON WHICH YOU ARE WORKING, FIND THE TABLE OF REJECTION SIZES FOR THAT ENGINE.

NOTE: BE SURE THAT YOU USE THE CRANKSHAFT TABLE AND NOT THE CAMSHAFT TABLE.

## LOOK:



3. MOST SMALL ENGINE CRANKSHAFTS HAVE 3 MAIN JOURNALS. LEARN WHERE EACH ONE IS ON THE CRANKSHAFT.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL THE EQUIPMENT YOU NEED.
2. FOUND THE PROPER CRANKSHAFT JOURNAL REJECTION SIZES FROM THE RIGHT TABLE IN THE MANUAL.
3. LEARNED ABOUT THE JOURNALS ON THE CRANKSHAFT.

"TURN THE PAGE"

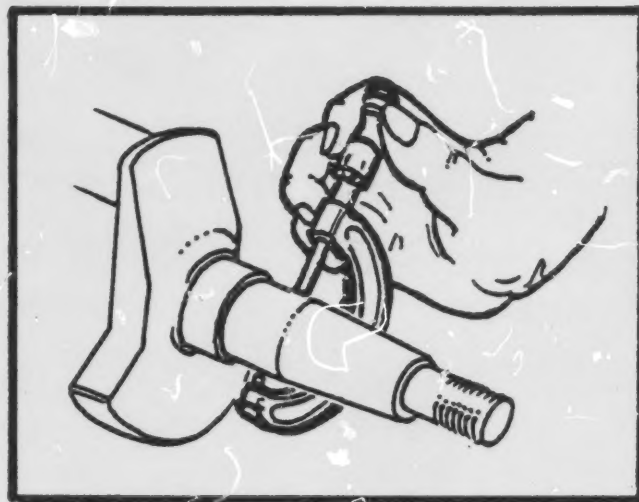
WORD GUIDEFRAGILE - EASILY BREAKABLE, DELICATEGROUND - WORN DOWNJOB STEPS

READ:

4. USE THE MICROMETER TO MEASURE THE MAGNETO JOURNAL. WRITE DOWN THE SIZE YOU MEASURE ON A PIECE OF SCRAP PAPER.

NOTE: MICROMETERS ARE FRAGILE AND EXPENSIVE. IF YOU DO NOT KNOW HOW TO USE ONE, ASK YOUR INSTRUCTOR FOR HELP.

LOOK:



5. MEASURE THE MAGNETO JOURNAL AT 3 OTHER PLACES ON THE JOURNAL AND WRITE DOWN THE SIZES.

6. CHECK THE SMALLEST NUMBER YOU MEASURED WITH THE REJECTION TABLE NUMBER FOR THE MAGNETO JOURNAL. IF THE MEASURED SIZE IS SMALLER, THE CRANK IS WORN. IS THE CRANKSHAFT USABLE?

NOTE: IF THE CRANKSHAFT IS NOT USABLE, IT CAN BE GROUND AND USED WITH SPECIAL UNDER-SIZED BEARINGS.



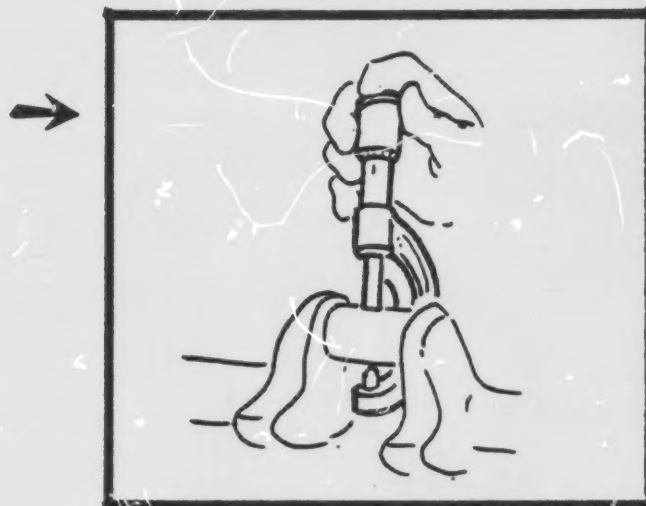
"TURN THE PAGE"

JOB STEPS

READ:

7. MEASURE THE CRANKPIN JOURNAL LIKE YOU DID IN JOB STEPS 4, 5, AND 6 ABOVE. IS THE CRANKSHAFT STILL USABLE?

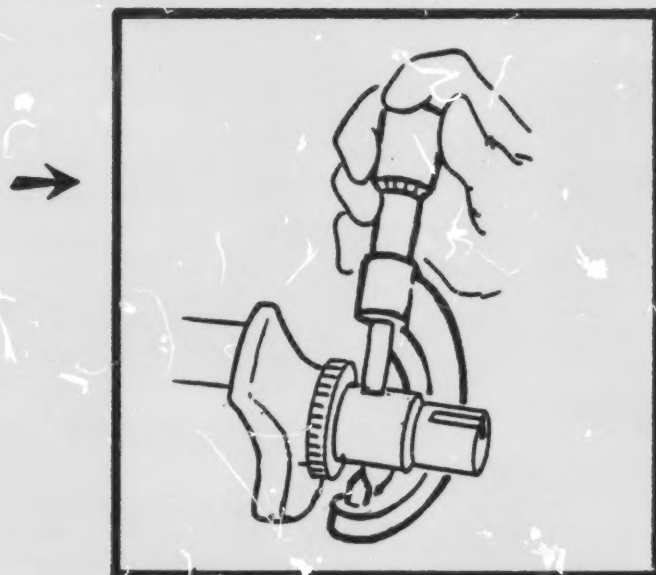
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. MEASURED THE MAGNETO JOURNAL IN AT LEAST 4 PLACES.
2. CHECKED THE SIZE IN THE REJECTION TABLE.
3. MEASURED THE CRANKPIN JOURNAL AND CHECKED IT FOR WEAR.

8. MEASURE AND CHECK THE PTO JOURNAL (DRIVE JOURNAL) AND CHECK IT AGAINST THE REJECTION SIZES. IS THE CRANKSHAFT STILL USABLE? IF NOT, TELL YOUR INSTRUCTOR.



"TURN THE PAGE"



WORD GUIDE

INSPECTED - LOOK OVER VERY  
CAREFULLY

JOB STEPS

READ:

LOOK:

9. NOW LOOK CAREFULLY AT THE  
CRANKSHAFT. CAREFULLY CHECK:

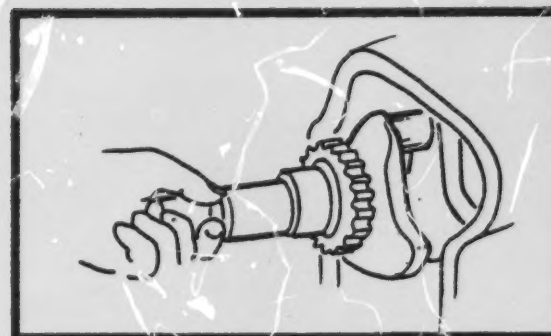
- A. GEAR TEETH
- B. KEYWAY AND KEY
- C. THREADS AT THE END OF  
CRANKSHAFT

THERE SHOULD BE NO CRACKS,  
MISSING TEETH, BROKEN PARTS OF  
SIGNS OF WEAR.

IS THE CRANKSHAFT STILL USABLE?  
IF SO . . . .



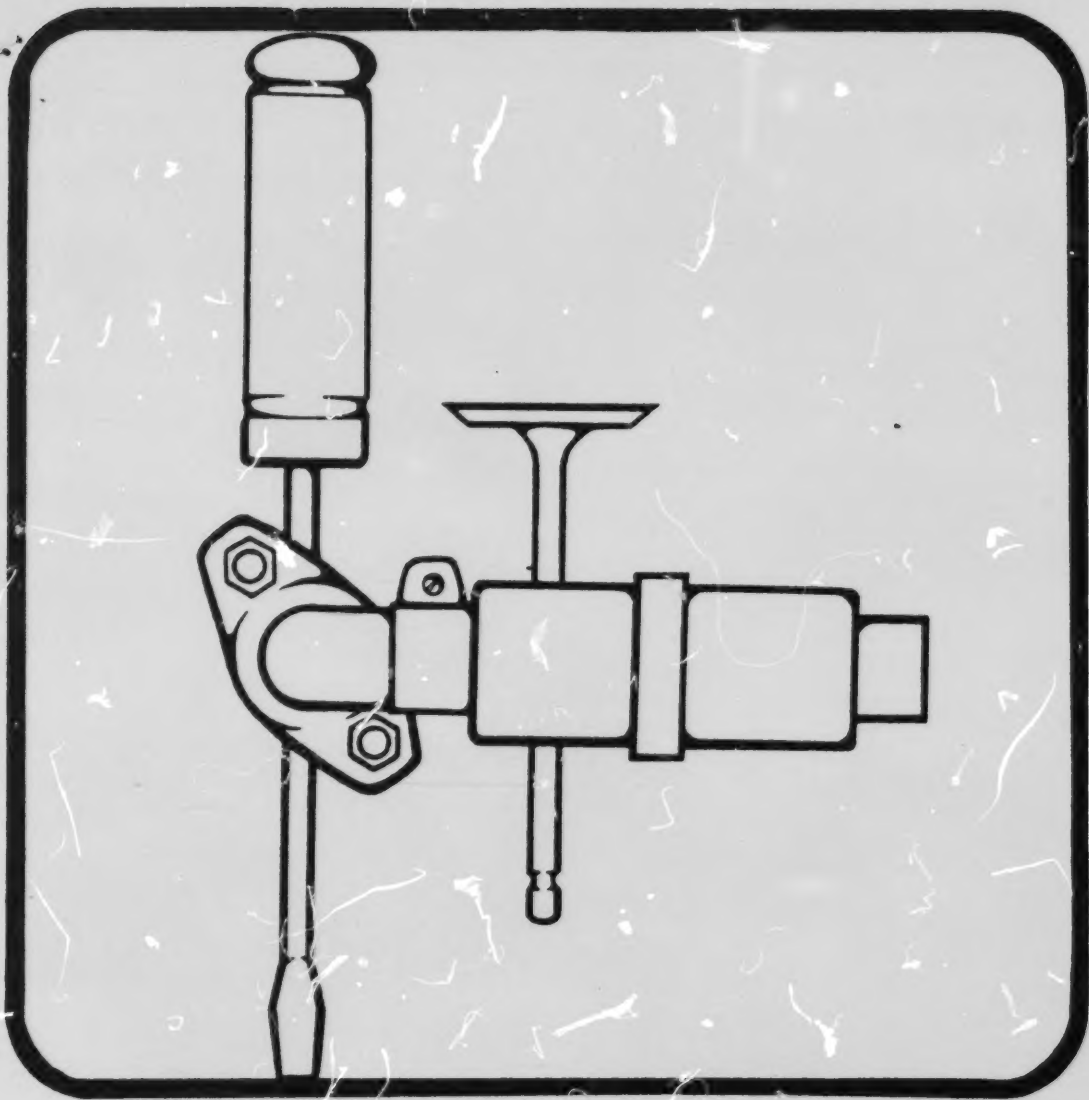
10. PUT THE CRANKSHAFT BACK IN  
THE ENGINE ACCORDING TO MOD #  
7501 01 023 1/7501 01 023 3.



11. PUT AWAY ALL EQUIPMENT AND  
MATERIALS AND CLEAN UP THE  
WORK AREA.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

- 1. MEASURED THE PTO JOURNAL AND CHECKED IT  
AGAINST REFECTION SIZES.
- 2. INSPECTED THE CRANKSHAFT FOR DAMAGE AND  
WEAR.
- 3. PUT THE CRANKSHAFT BACK IN THE ENGINE.
- 4. PUT AWAY ALL THE EQUIPMENT IN THE RIGHT  
PLACE AND CLEANED UP THE WORK AREA.



## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 023 3 date: MAY 1978 level: I

skill title: REPLACING CRANKSHAFT ON A 2- OR 4-CYCLE ENGINE

developed & written by: JACK HELDER

visuals by: DAVE WEHRWEIN

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REPLACE THE CRANKSHAFT IN A SMALL ENGINE AND CHECK AND ADJUST END PLAY.

AND IN ORDER TO DO THIS YOU WILL NEED:

A 2- OR 4-CYCLE ENGINE



SET OF CRANKCASE  
COVER GASKETS



DIAL INDICATOR KIT



SOCKET WRENCH SET



HAMMER



PUNCH



SEALER



SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU GET THE EQUIPMENT YOU WILL NEED.
2. YOU CAN REPLACE THE CRANKSHAFT.
3. YOU CHECK AND ADJUST END PLAY.
4. THE ENGINE RUNS SMOOTHLY WHEN YOU ARE DONE.

"TURN THE PAGE"

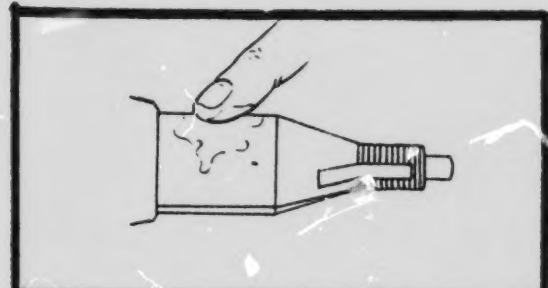
JOB STEPS

READ:

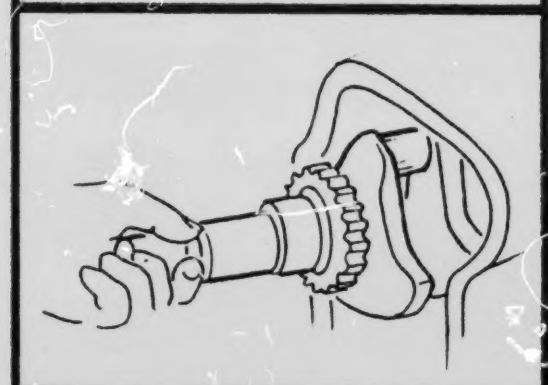
1. PUT OIL ON THE CRANKSHAFT JOURNALS.



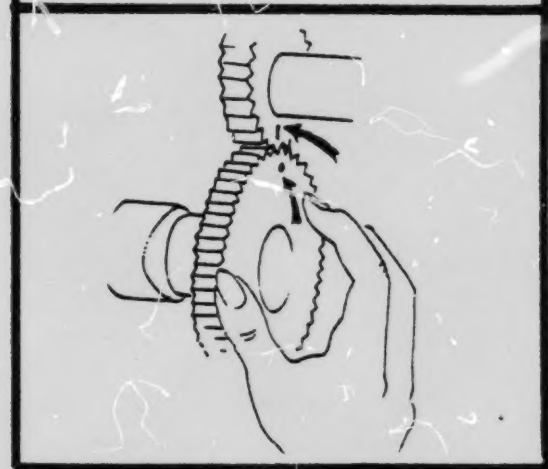
LOOK:



2. SLIDE THE CRANKSHAFT INTO THE PTO END. THE MAGNETO END OF THE CRANKSHAFT SHOULD GO FIRST.



3. PUT IN THE CAM GEAR. THE TIMING MARK SHOULD LINE UP WITH THE MARK ON THE CRANKSHAFT.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. OILED THE JOURNALS.
2. SLID THE MAGNETO END OF THE CRANKSHAFT INTO THE PTO SIDE OF THE ENGINE.
3. PUT IN THE CAM GEAR.
4. LINED UP THE TIMING MARKS.

"TURN THE PAGE"

JOB STEPS

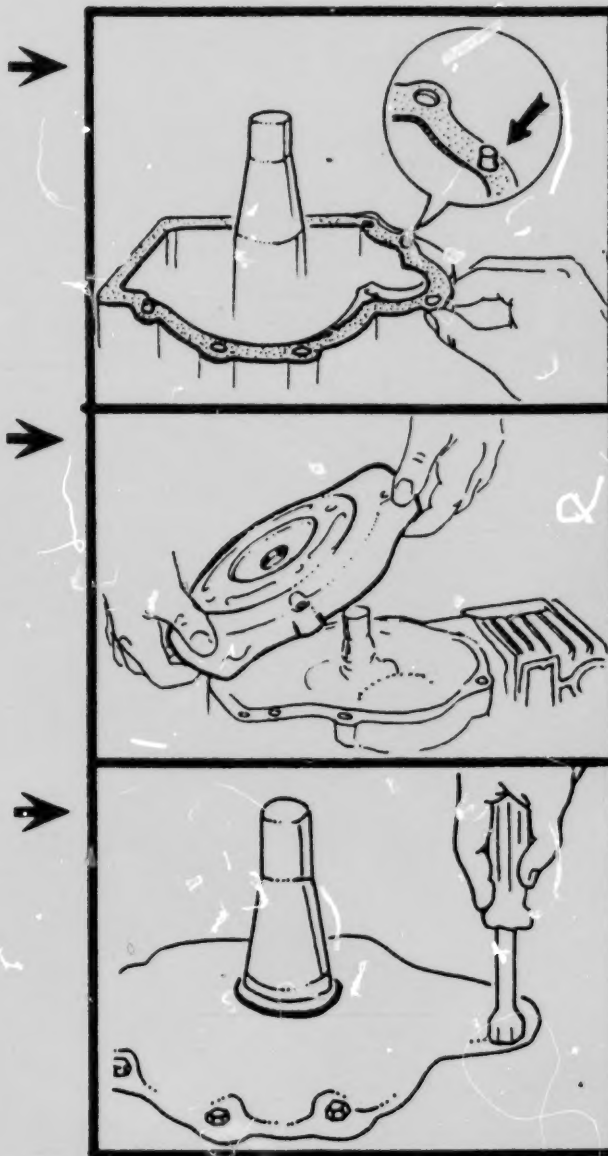
READ:

4. PUT THE .015 GASKET ON THE  
CRANKCASE. USE SEALER ON THE  
CRANKCASE.

5. PUT ON THE COVER.

6. TIGHTEN THE COVER.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT ON SEALER.
2. PUT ON THE COVER.
3. TIGHTENED THE COVER.

"TURN THE PAGE"



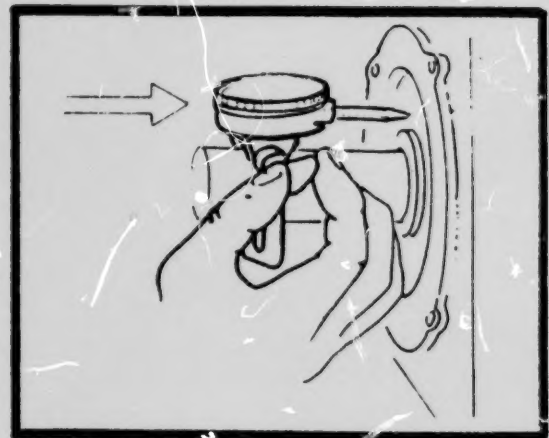
JOB STEPS

READ:

7. CHECK END PLAY USING THE DIAL INDICATOR KIT.

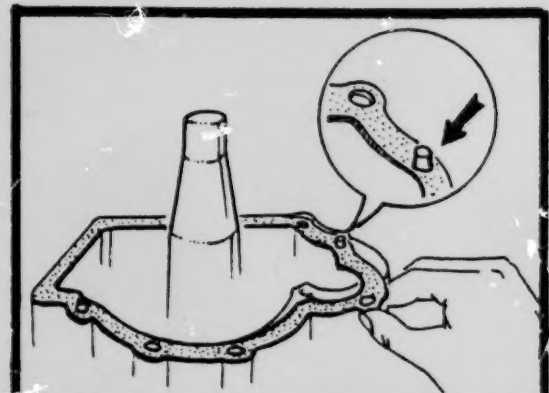


LOOK:

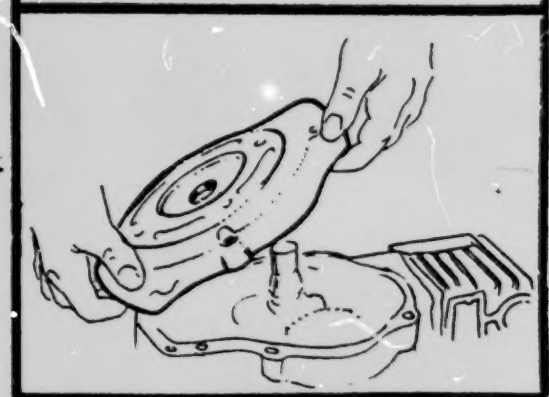


8. IF THE CRANKSHAFT END PLAY WAS LESS THAN .002, REMOVE THE CRANK-SHAFT COVER. IF IT WAS MORE THAN .008, GO TO STEP 12.

9. REMOVE .015 GASKET AND PUT ON A THINNER GASKET.



10. PUT COVER BACK ON AND TIGHTEN.



"TURN THE PAGE"

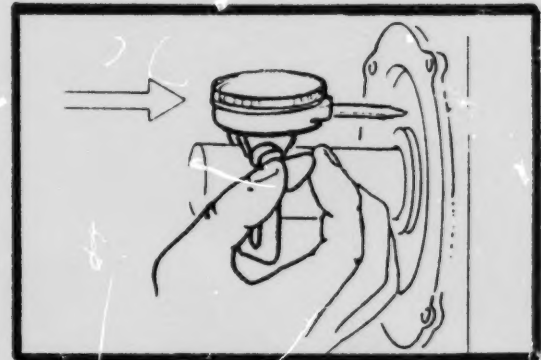
JOB STEPS

READ:

11. MEASURE END PLAY.

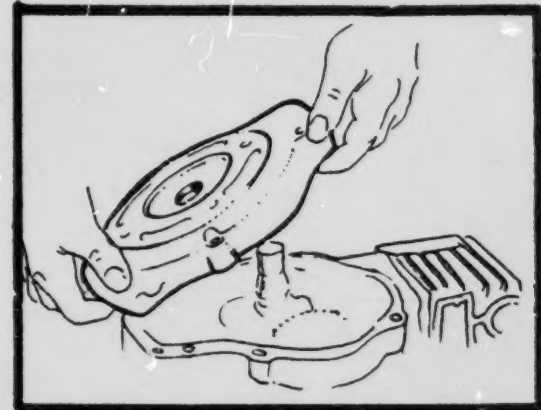
NOTE: IF CRANKSHAFT STILL DOES NOT MEASURE BETWEEN .002 AND .008, SEE YOUR INSTRUCTOR.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK.

12. IF CRANKSHAFT MEASURED MORE THAN .008 WITH THE .015 GASKET IN, YOU MUST USE A THRUST WASHER. REMOVE COVER.



13. SLIDE WASHER ON SHAFT UNTIL IT IS TIGHT AGAINST GEAR.

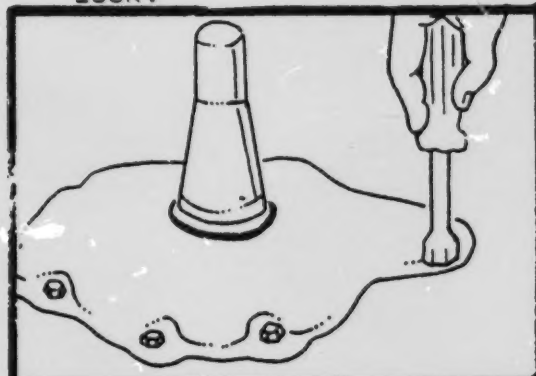
"TURN THE PAGE"

JOB STEPS

READ:

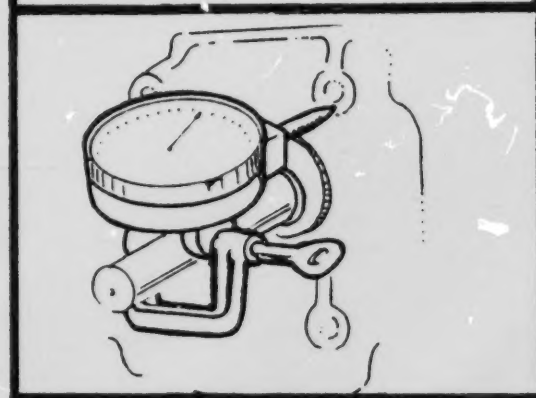
14. REPLACE COVER AND TIGHTEN IT. →

LOOK:

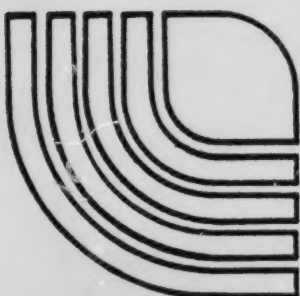
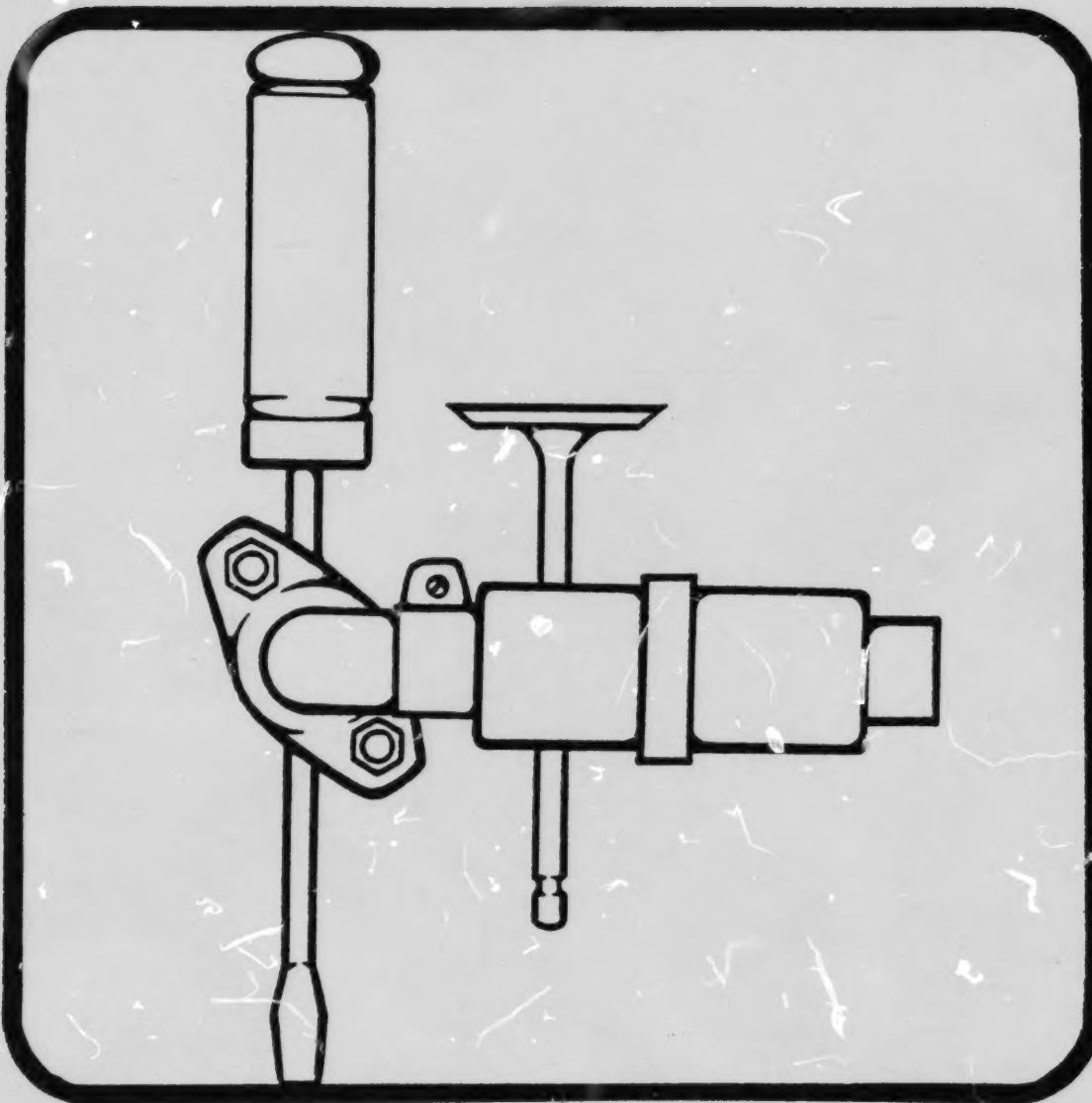


15. MEASURE THE END PLAY. →

NOTE: IF CRANKSHAFT STILL DOES  
NOT MEASURE BETWEEN .002 AND .008,  
SEE YOUR INSTRUCTOR.



CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK.



## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 024 1  
7501 01 024 3 date: FEBRUARY 1978 level: I

skill title: CHECK OIL PUMP

developed & written by: JACK HELDER

visuals by: DAVE WEHRWEIN & BRUCE BENNETT

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

HOW TO CHECK AN OIL PUMP TO SEE IF GEAR TEETH ARE CHIPPED  
AND IF THE PUMP WORKS.

AND IN ORDER TO DO THIS YOU WILL NEED:

ENGINE WITH AN OIL PUMP

HAND TOOLS

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE CHECKED THE GEAR TEETH.
2. YOU KNOW IF THE PUMP WORKS.
3. YOU HAVE REPLACED THE SUMP AND THE OIL PUMP WORKS.



JOB STEPS

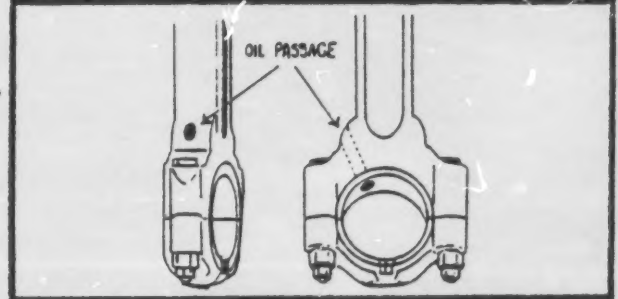
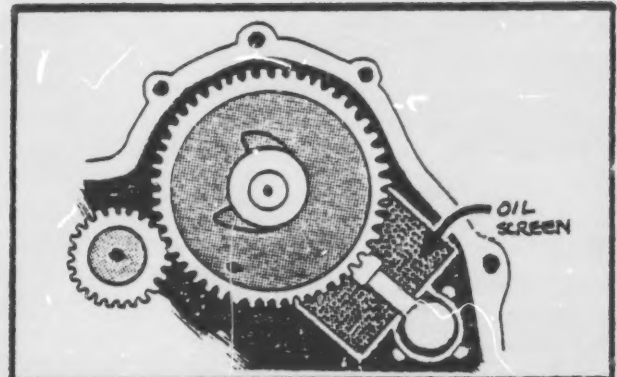
## READ:

1. LOOK AT THESE DRAWINGS OF HOW A PUMP WORKS.

A. OIL IS SUCKED THROUGH THE SCREEN AND PUMPED THROUGH THE ENGINE.

B. OIL GOES THROUGH THE HOLES IN THE CONNECTING ROD, BEARING AND PISTON PIN.

## LOOK:



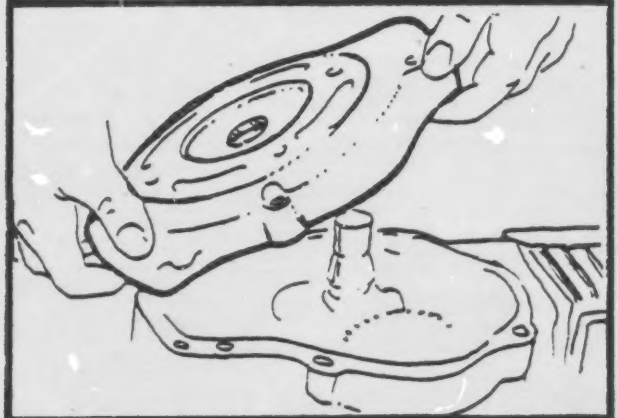
CHECK: TELL YOUR INSTRUCTOR HOW AN OIL PUMP WORKS.

2. GET AN ENGINE WITH AN OIL PUMP.

3. REMOVE THE SUMP AS YOU LEARNED IN MODULE

7501 01 001 1

7501 01 001 3. REMOVE AND REPLACE ENGINE BASE SUMP.



JOB STEPS

READ:

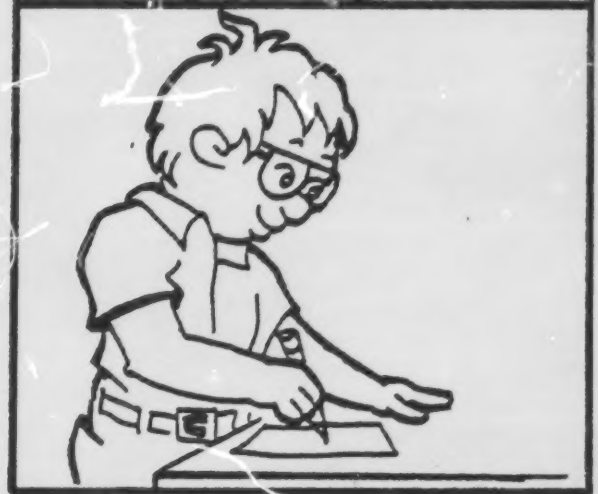
4. CHECK THE SUMP FOR ANY  
WORN OR BROKEN PARTS.



LOOK:

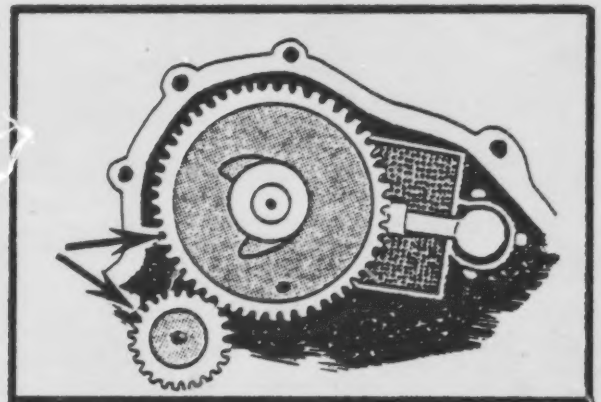


5. MAKE A LIST OF NEEDED  
NEW PARTS.



CHECK: HAVE YOUR INSTRUCTOR CHECK THAT YOU HAVE  
REMOVED THE SUMP AND CHECKED IT FOR ANY  
NEEDED PARTS.

6. FIND THE TEETH ON THE  
GEARS IN THE PUMP.



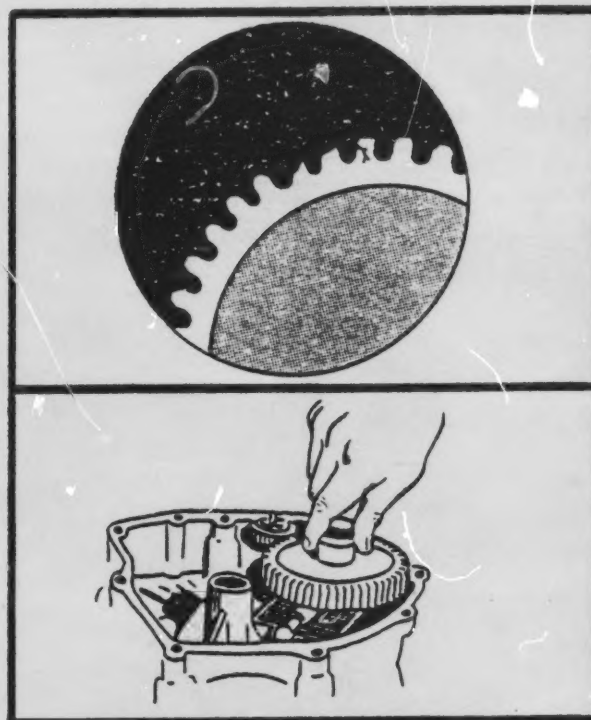
WORD GUIDEMESH - FIT TOGETHER.JOB STEPS

READ:

7. CHECK FOR BROKEN OR  
CHIPPED TEETH ON THE GEARS.

8. TURN THE GEARS TO SEE  
THAT THEY MESH AND TURN.

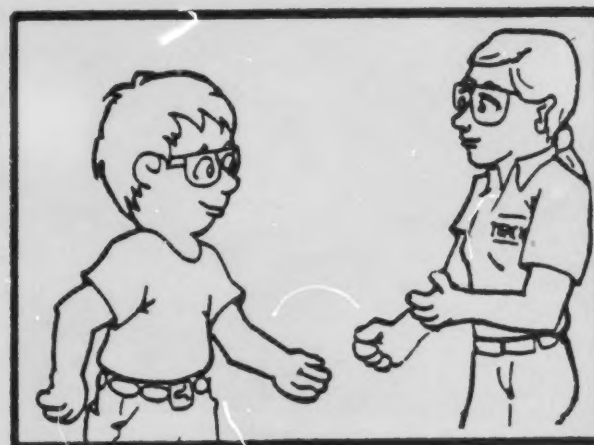
LOOK:



CHECK: HAVE THE INSTRUCTOR CHECK TO SEE THAT YOU:

1. CHECKED THE GEAR TEETH FOR CHIPS OR BROKEN TEETH.
2. MADE SURE THE GEARS TURN AND MESH.

9. HAVE YOUR INSTRUCTOR  
HELP YOU PUT OIL IN THE SUMP  
AND TURN THE GEARS. THIS  
WILL SHOW YOU IF THE PUMP  
IS WORKING.



"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

10. IF GEARS OR PUMP NEED TO BE REPLACED, HAVE YOUR INSTRUCTOR HELP YOU.

11. PUT THE SUMP BACK ON THE ENGINE.



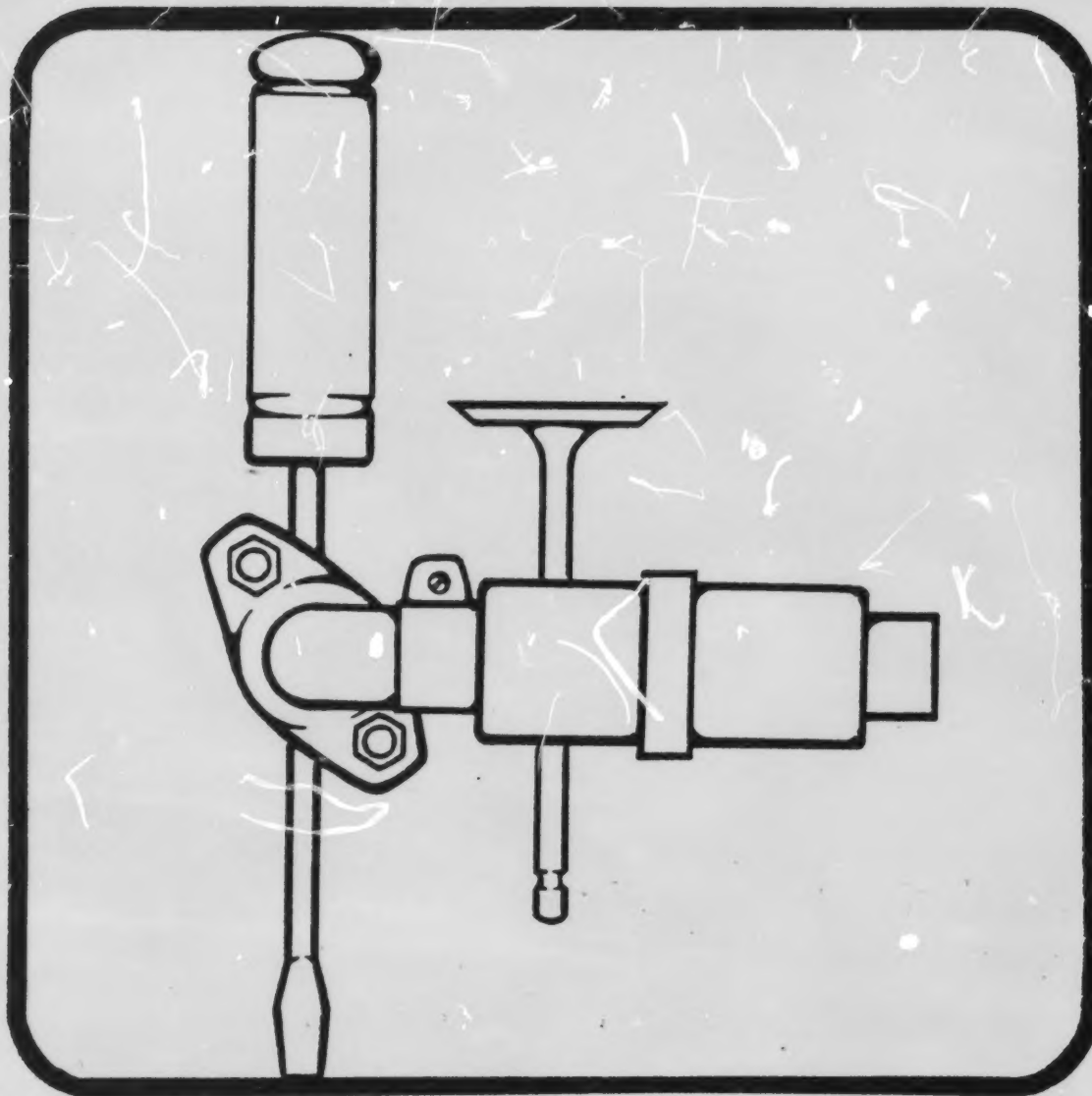
12. PUT OIL IN THE ENGINE.



CHECK: HAVE YOUR INSTRUCTOR CHECK THAT:

1. YOU HAVE PUT THE SUMP ON IN THE RIGHT WAY.
2. YOU HAVE FILLED THE ENGINE WITH OIL.

13. WITH YOUR INSTRUCTOR, START THE ENGINE TO BE SURE THE PUMP WORKS.



## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 025 1  
7501 01 025 3 date: FEBRUARY 1978 level: I

skill title: CHECK DIPPER OR SLINGER

developed & written by: JACK HELDER

visuals by: BRUCE BENNETT

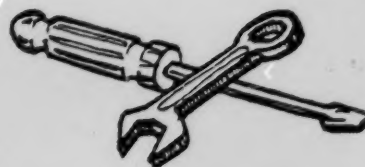


PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO CHECK THE OIL DIPPER AND REPLACE IF NEEDED.

IN ORDER TO DO THIS YOU WILL NEED:

ENGINE WITH AN OIL DIPPER



HAND TOOLS



TORQUE WRENCH



SERVICE MANUAL

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE CHECKED THE OIL DIPPER.
2. YOU HAVE REPLACED THE DIPPER IF IT IS WORN OR BROKEN.
3. THE DIPPER WORKS WELL ON THE ENGINE YOU HAVE WORKED ON.

JOB STEPS

## READ:

1. LOOK AT THE TWO DRAWINGS OF OIL DIPPERS:

TYPE A: CAST ON TO THE CONNECTING ROD.



TYPE B: BOLTED TO THE CAP.



2. LOOK HOW A DIPPER SPLASHES OIL ONTO OTHER ENGINE PARTS WHEN THE CRANKSHAFT TURNS.

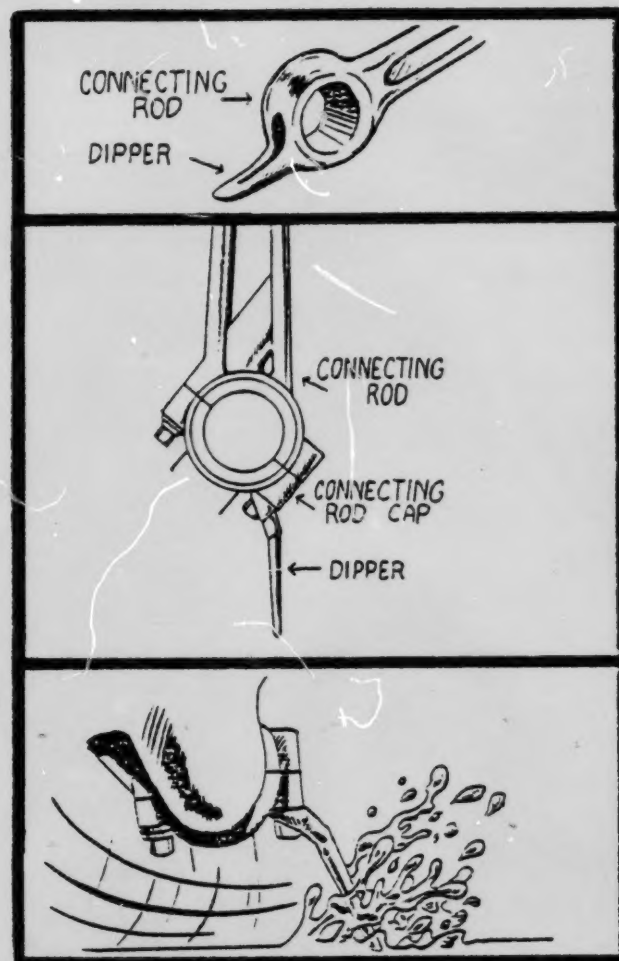


CHECK: TELL YOUR INSTRUCTOR:

1. THE TWO TYPES OF DIPPERS.
2. HOW THE DIPPER GETS OIL ON OTHER ENGINE PARTS.

3. GET AN ENGINE TO WORK ON THAT HAS AN OIL DIPPER.

## LOOK:



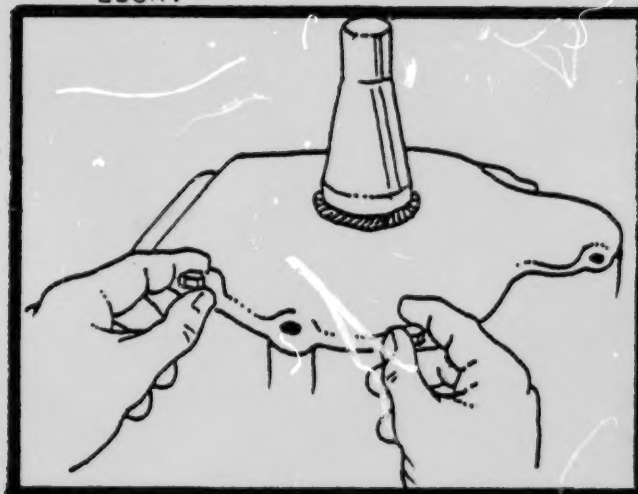
JOB STEPS

READ:

4. REMOVE THE SUMP AS YOU LEARNED IN MODULE 7501 01 001 1 - 7501 01 001 3, "REMOVE AND REPLACE ENGINE BASE SUMP".



LOOK:



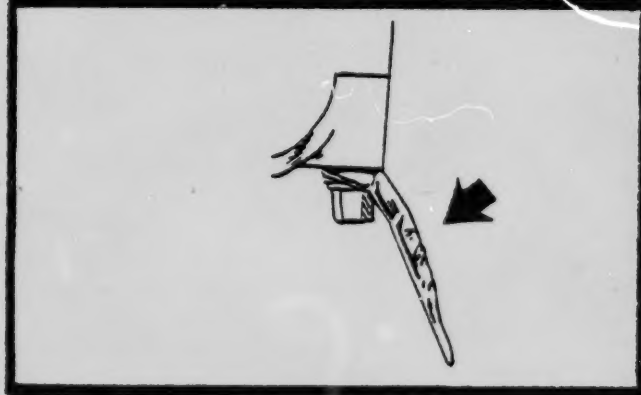
CHECK: HAVE YOUR INSTRUCTOR CHECK THAT YOU HAVE REMOVED THE SUMP IN THE RIGHT WAY.

5. CHECK PARTS OF THE SUMP FOR WEAR.

6. MAKE A LIST OF ANY NEW PARTS YOU WILL NEED.



7. LOOK AT THE OIL DIPPER TO SEE IF IT IS CRACKED OR BROKEN.



JOB STEPS

READ:

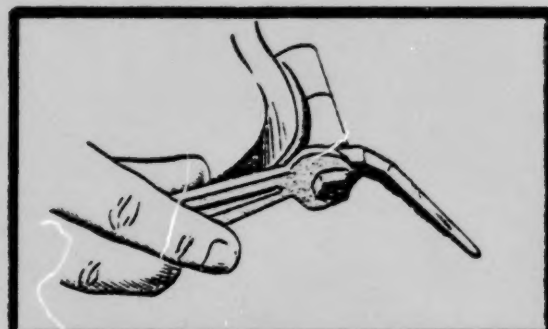
LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

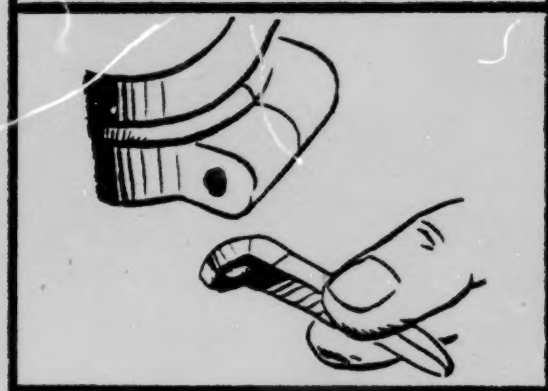
1. CHECKED SUMP PARTS FOR WEAR.
2. MADE A LIST OF ANY NEW PARTS YOU WILL NEED.
3. CHECKED THE DIPPER.

NOTE: THIS MOD SHOWS YOU HOW TO REMOVE AND REPLACE A BOLT-ON TYPE DIPPER.

8. REMOVE THE ROD BOLTS THAT  
HOLD THE DIPPER TO THE CAP.



9. TAKE OFF THE DIPPER.



CHECK: SHOW THE DIPPER TO YOUR INSTRUCTOR.

10. PUT THE DIPPER, OR A NEW  
ONE, ON THE CAP.

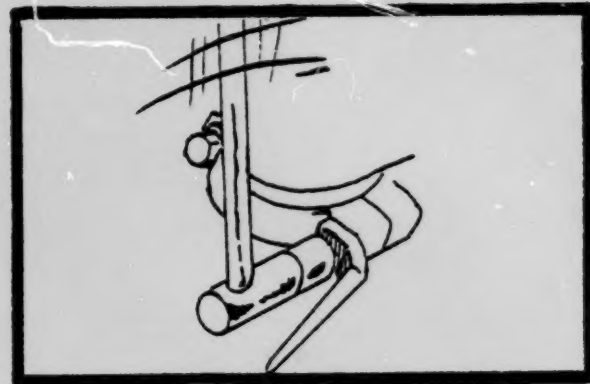
JOB STEPS

READ:

11. TORQUE THE BOLTS ON THE CAP.  
READ THE SPECIFICATIONS IN THE  
SERVICE MANUAL TO FIND OUT HOW  
MUCH TORQUE IS NEEDED.



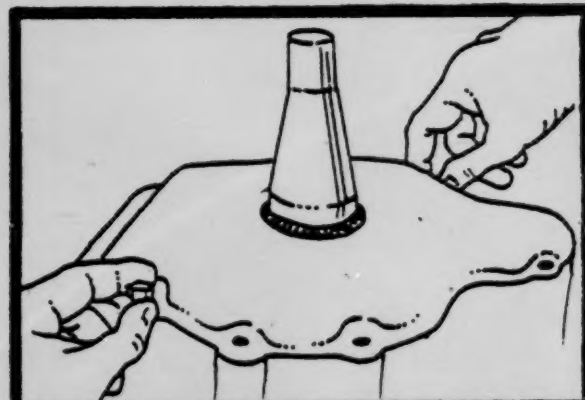
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REPLACED THE DIPPER.
2. TIGHTENED THE CAP BOLTS TO THE RIGHT TORQUE.

12. PUT THE SUMP BACK ON. USE  
ANY NEW PARTS THAT ARE NEEDED.



13. PUT OIL IN THE ENGINE.

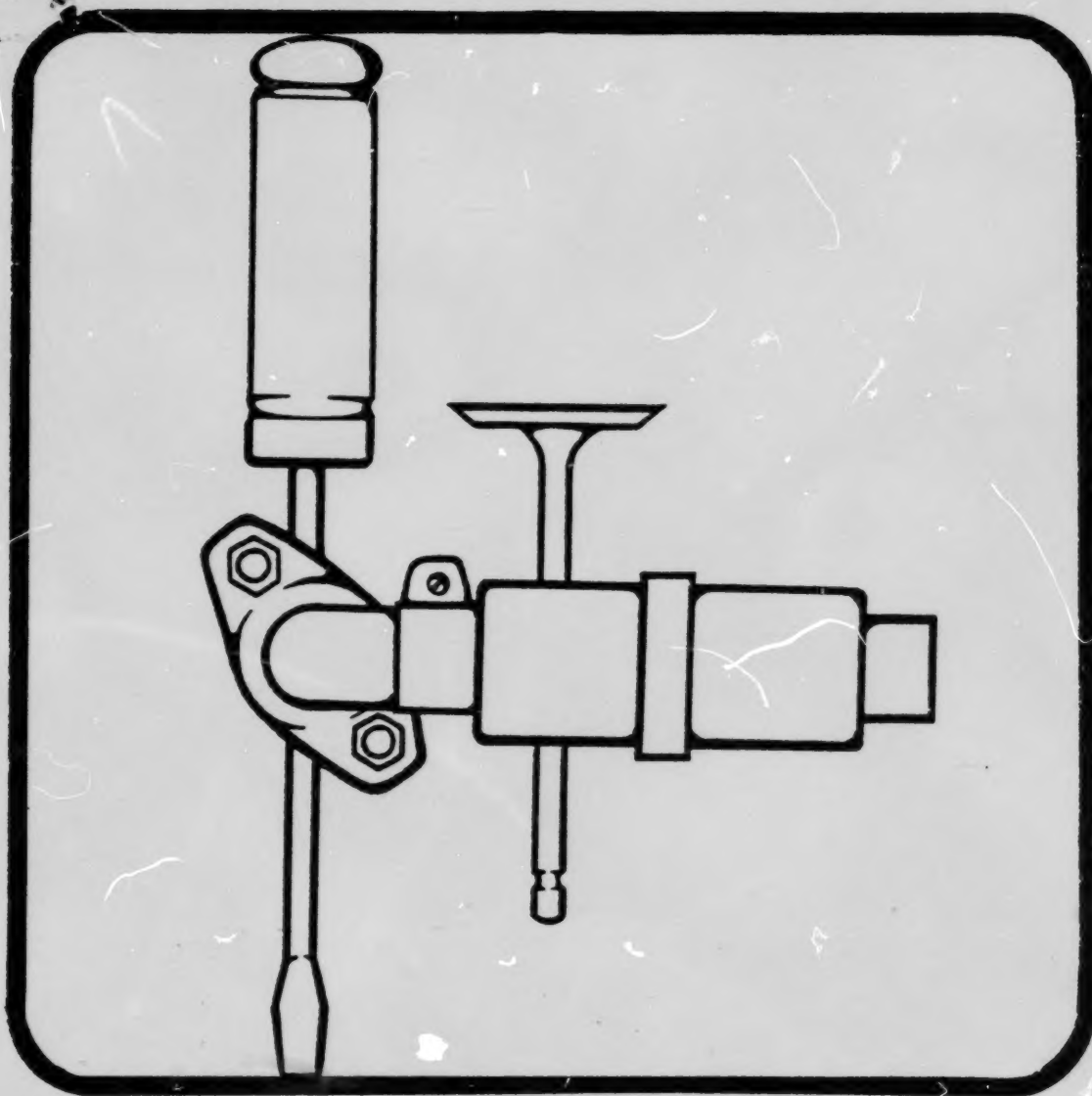


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT:

1. THE SUMP IS ON RIGHT.
2. THE ENGINE IS FULL OF OIL.

14. HAVE YOUR INSTRUCTOR HELP  
TO CHECK THAT THE ENGINE STARTS  
AND THAT THE DIPPER WORKS.





## small engine repair

unit: ENGINE BLOCK

capital area career center

module: 7501 01 026 1  
7501 01 026 3 date: APRIL 1978 level: II

skill title: REMOVE CRANKSHAFT FROM A 2- OR 4- CYCLE ENGINE

developed & written by: DWIGHT SMITH AND ERIC SCHWING

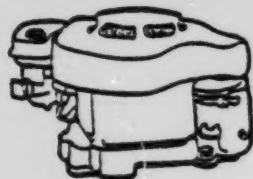
visuals by: DAVE WEHRWEIN

PERFORMANCE OBJECTIVE

DAMAGING - BREAKING, SCRATCHING, ETC.  
GUIDELINES - RULES

YOU ARE GOING TO LEARN:

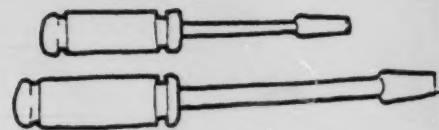
HOW TO REMOVE A CRANKSHAFT FROM A SMALL ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:

2- OR 4- STROKE ENGINE



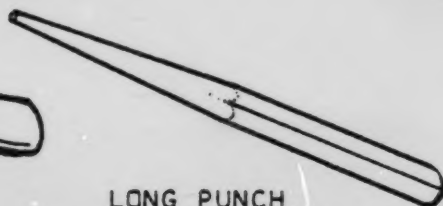
SOCKET SET



SCREWDRIVER SET



RUBBER Mallet



LONG PUNCH



FILE OR EMERY CLOTH



SERVICE MANUAL



SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE THE EQUIPMENT FOR THIS MOD.
2. YOU HAVE REMOVED THE CRANKSHAFT FROM THE ENGINE WITHOUT DAMAGING ANY PARTS.
3. YOU HAVE PUT THE CRANKSHAFT BACK INTO THE ENGINE SO THAT IT IS SET TO GUIDELINES AND RUNS SMOOTHLY.

"TURN THE PAGE"

JOB STEPSREAD:

1. TAKE ALL EQUIPMENT TO  
YOUR WORK AREA.



2. READ THE REPAIR GUIDELINES  
IN THE SERVICE MANUAL FOR THIS  
ENGINE.



3. FIND OUT IF THE ENGINE ON  
WHICH YOU ARE WORKING HAS BALL  
BEARINGS. IF SO, YOU MUST FIND  
GUIDELINES TO TAKE OUT THE  
MAGNETO. THE GUIDELINES ARE  
IN THE SERVICE MANUAL AND IN  
THIS MOD.



4. FIND OUT IF THE ENGINE HAS  
A CAST-IRON OR ALUMINUM BLOCK  
SO YOU KNOW HOW TO TAKE OUT  
THE CRANK.

LOOK:

"TURN THE PAGE"

WORD GUIDE

BURRS - SHARP PIECES OF METAL  
STICKING OUT

JOB STEPSREAD:

5. YOU MUST TAKE APART THE ENGINE ENOUGH SO YOU CAN THEN TAKE OUT THE CRANKSHAFT. LOOK IN THE SERVICE MANUAL (AND THIS MOD) TO FIND OUT WHEN THE ENGINE IS READY FOR YOU TO SERVICE IT.

LOOK:

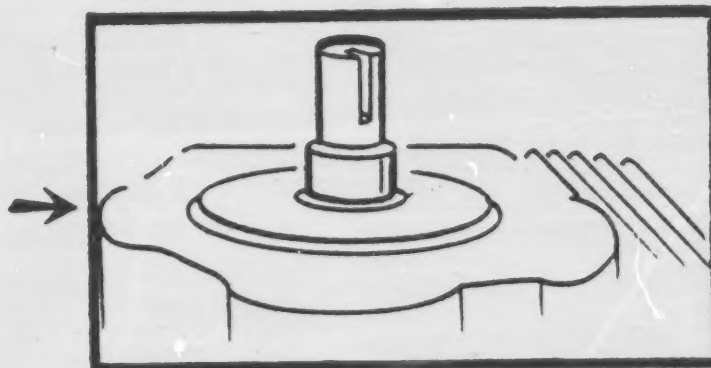
\*\*\*\*\*  
 CAUTION: WEAR SAFETY GLASSES. TAKE  
 YOUR TIME, AND ASK QUESTIONS  
 WHEN NEEDED.  
 \*\*\*\*\*

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU:

1. HAVE ALL THE EQUIPMENT YOU NEED.
2. KNOW ABOUT THE ENGINE YOU ARE WORKING ON.
3. HAVE ON YOUR SAFETY GLASSES.

ALUMINUM BLOCKS

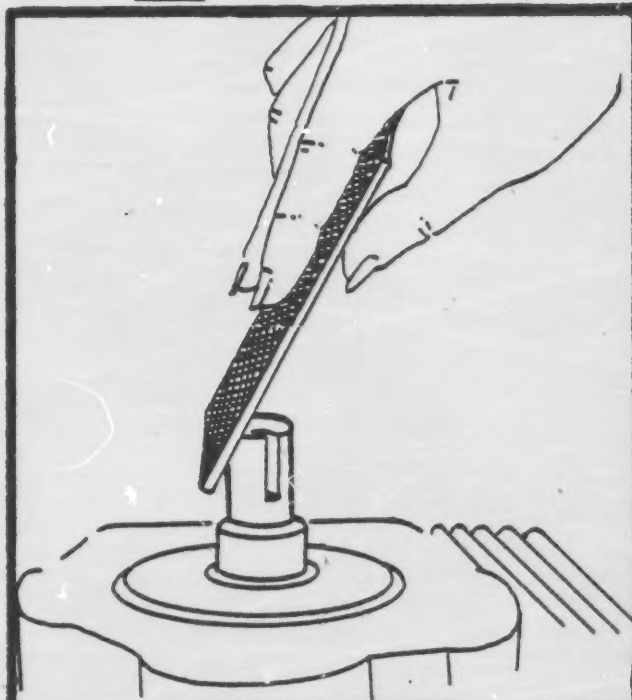
1. LOOK AT THE END OF THE CRANKSHAFT STICKING OUT OF THE ENGINE. THIS IS THE "POWER TAKE OFF", OR "PTO" END. CHECK FOR RUST OR BURRS ON THE END.



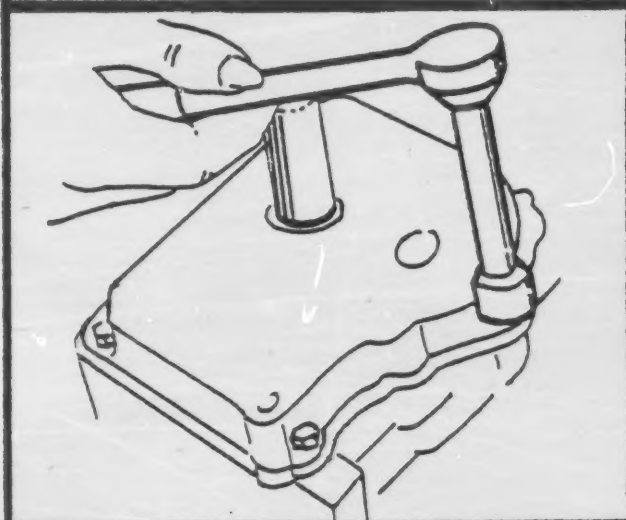
"TURN THE PAGE"

READ:JOB STEPSMALLET - HAMMERLOOK:

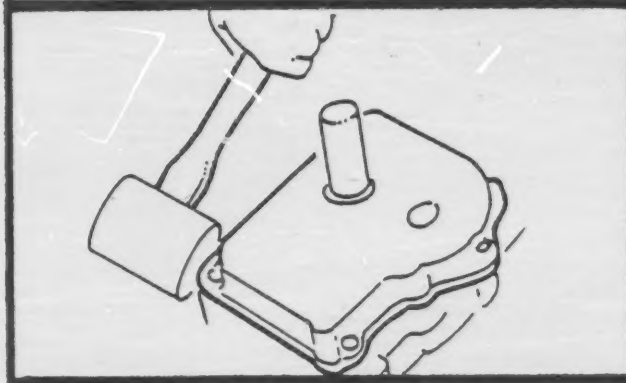
2. USE A FILE OR EMERY CLOTH TO REMOVE RUST OR BURRS. MAKE THE SHAFT CLEAN AND SMOOTH. →



3. USE THE RIGHT SOCKET TO REMOVE THE CRANKCASE COVER BOLTS. PUT THEM IN A SAFE PLACE. →



4. REMOVE THE COVER. IF IT STICKS, USE A RUBBER MALLET TO LIGHTLY TAP THE COVER TO MAKE THE SEAL LOOSE. →



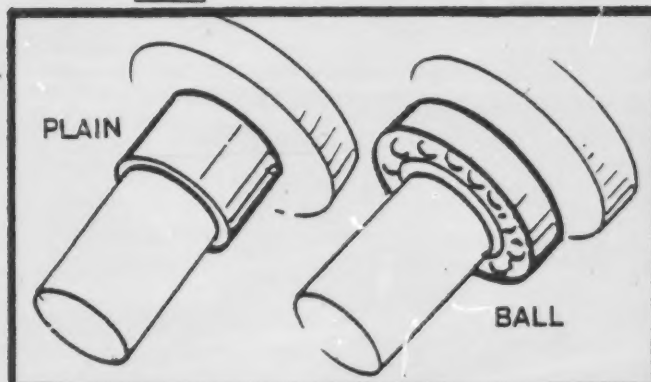


JOB STEPSWORD GUIDE

6

CAREFULLY - WITH CAREREAD:

5. LOOK CAREFULLY AT THE BEARINGS ON THE PTO SIDE. FIND AND FOLLOW THE GUIDELINES FOR BALL OR PLAIN BEARINGS.

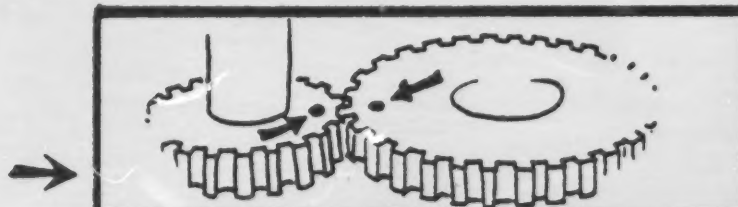
LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

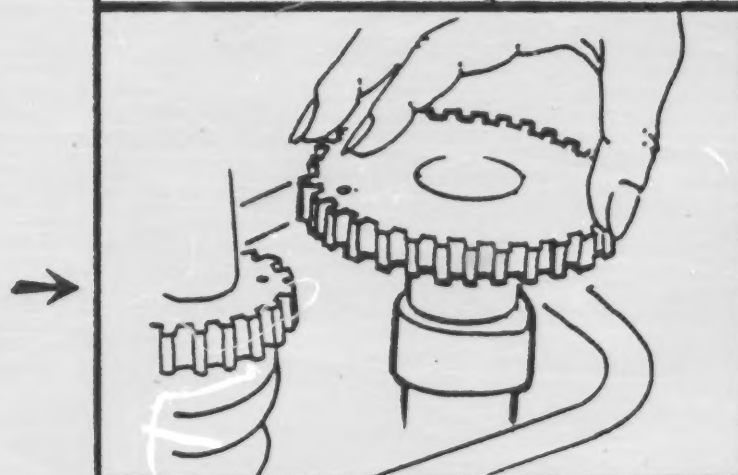
1. CLEANED THE END OF THE CRANK.
2. REMOVED THE CRANKCASE COVER.
3. FOUND OUT IF THE ENGINE HAS PLAIN OR BALL BEARINGS, AND FOUND THE RIGHT GUIDELINES.

6. PLAIN BEARINGS

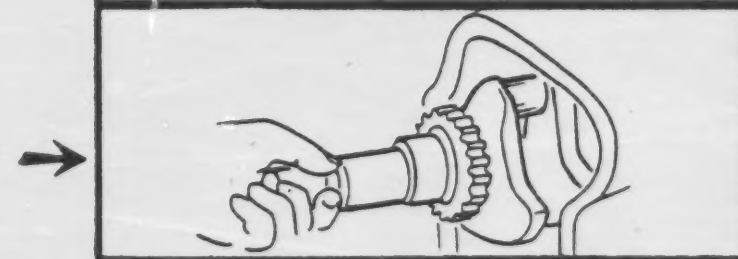
- A. TURN THE CRANKSHAFT UNTIL THE TIMING MARKS ON THE CRANK AND THE CAM GEARS LINE UP.



- B. CAREFULLY PULL OUT THE CAM GEAR.



- C. BEING SLOW AND CAREFUL, PULL THE CRANKSHAFT OUT OF THE BLOCK.



  
WORD GUIDE

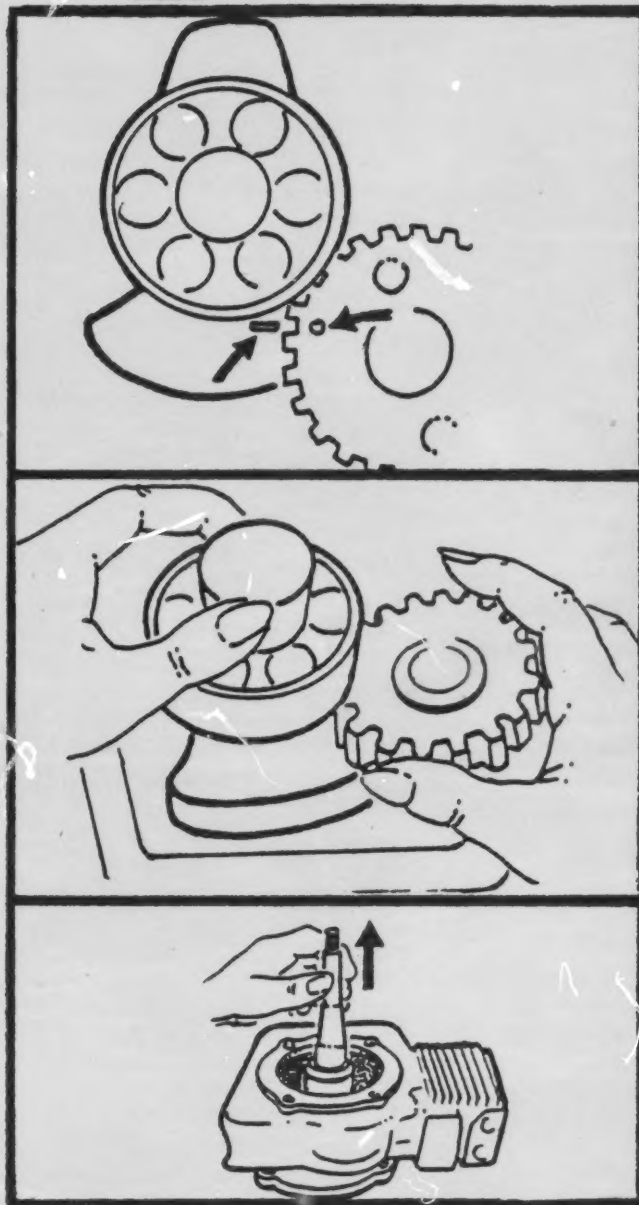
COUNTERWEIGHT - PART OF THE ENGINE  
THAT BALANCES THE ENGINE

JOB STEPSREAD:7. BALL BEARINGS

- A. YOU CAN'T SEE THE TIMING  
MARK ON AN ENGINE  
WITH BALL BEARINGS.  
FIND THE MARK ON THE  
CRANKSHAFT COUNTER-  
WEIGHT.

- B. TURN THE CRANKSHAFT  
UNTIL THE TIMING MARK  
ON THE CAM GEAR LINES  
UP WITH THE MARK ON  
THE COUNTERWEIGHT.

- C. CAREFULLY PULL THE  
CRANKSHAFT AND CAM GEAR  
OFF AND OUT. BE CARE-  
FUL NOT TO DAMAGE ANY  
PARTS.

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE CRANKSHAFT FROM THE BLOCK.

"TURN THE PAGE"

JOB STEPSREAD:CAST IRON BLOCKS

1. CHECK THE END OF THE CRANK-SHAFT STICKING OUT OF THE ENGINE. THIS IS THE POWER TAKE OFF END OR "PTO." LOOK FOR BURRS OR RUST.



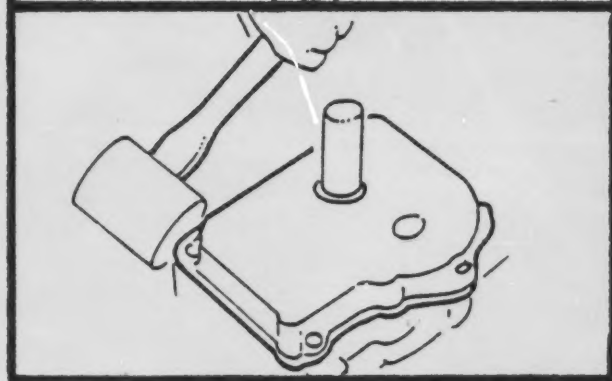
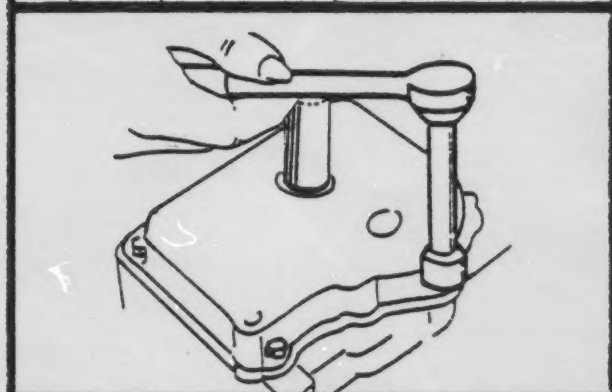
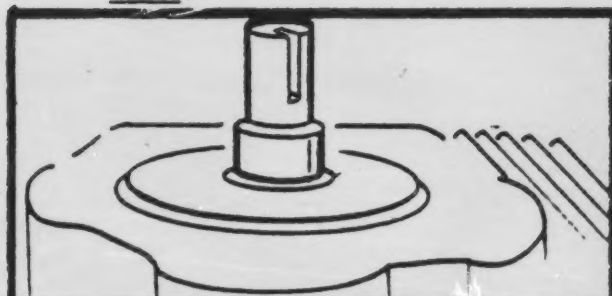
2. USE A FILE OR EMERY CLOTH TO REMOVE ANY BURRS OR RUST.



3. USE A SOCKET TO REMOVE THE BOLTS HOLDING ON THE CRANKCASE COVER.



4. TAKE OFF THE CRANKCASE COVER. IF THE COVER STICKS, LIGHTLY TAP IT WITH A RUBBER Mallet TO MAKE IT LOOSE.

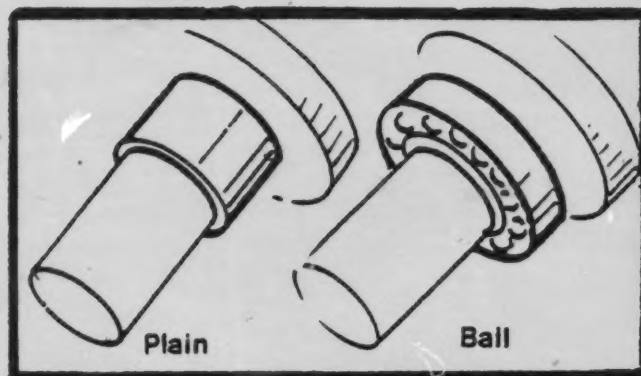
LOOK:

WORD GUIDE

WIGGLE - TWIST AND TURN, SHAKE  
A LITTLE

JOB STEPSREAD:

5. LOOK AT THE PTO END OF THE CRANK TO SEE IF IT HAS PLAIN OR BALL BEARINGS. FIND AND FOLLOW THE GUIDELINES FOR THE TYPE OF BEARINGS ON THE ENGINE.

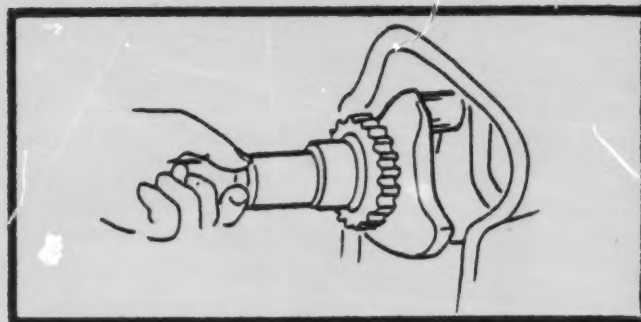
LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CLEANED THE PTO END OF THE CRANKSHAFT
2. REMOVED THE CRANKCASE COVER.
3. FOUND THE RIGHT GUIDELINES FOR THE TYPE OF BEARINGS ON THE ENGINE.

6. PLAIN BEARINGS

- A. TURN THE CRANKSHAFT SO THAT THE CRANKPIN POINTS UP AND TO THE REAR OF THE ENGINE.



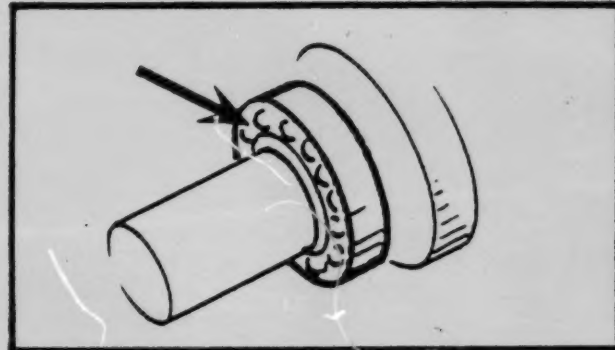
- B. WHEN THE CRANK IS IN THE RIGHT PLACE, IT WILL COME OUT EASILY. YOU MAY NEED TO WIGGLE THE CRANK A LITTLE TO GET IT INTO THE RIGHT PLACE.

NOTE: NEVER FORCE THE CRANK OR YOU WILL DAMAGE IT.

READ:JOB STEPSLOOK:7. BALL BEARINGS

NOTE: SOME ENGINES HAVE BALL BEARINGS ON THE PTO END OF THE CRANK. ON THESE ENGINES, THE CRANKSHAFT IS REMOVED FROM THE MAGNETO END.

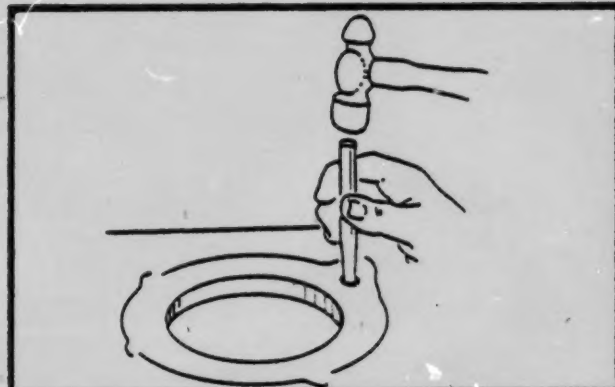
- A. FIND THE GUIDELINES FIRST AND THEN REMOVE THE MAGNETO.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. FOUND THE RIGHT TYPE OF BEARINGS IN THE ENGINE.
2. REMOVED THE MAGNETO, IF NEEDED.

- B. USE A LONG PUNCH AND, WITH CARE, TAP THE CAM GEAR SHAFT INTO THE ENGINE FROM THE PTO SIDE. BE CAREFUL TO DRIVE THE SHAFT ALL THE WAY OUT. LET THE PUNCH HOLD THE CAM GEAR IN.



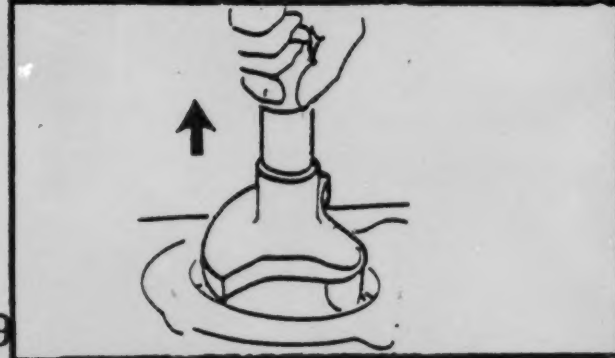
- C. HOLD ONTO THE CAM GEAR AND PULL OUT THE PUNCH.



- D. PUSH THE GEAR INTO A SPACE IN THE ENGINE CRANKCASE WHERE IT WILL NOT TOUCH THE CRANK GEAR.



- E. NOW PULL THE CRANKSHAFT CAREFULLY OUT OF THE ENGINE BLOCK FROM THE MAGNETO SIDE.





JOB STEPSREAD:

8. YOU ARE NOW READY TO MIKE  
AND LOOK CLOSELY AT THE CRANKSHAFT  
(SEE MOD 7501 01 022 1  
7501 01 022 3).

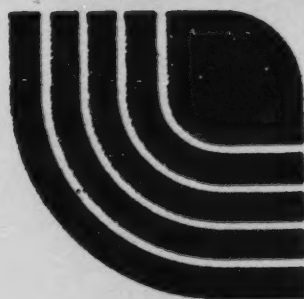
LOOK:

9. PUT AWAY THE TOOLS AND  
CLEAN UP THE WORK AREA.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE CRANKSHAFT WITHOUT DAMAGING ANY PARTS.
2. PUT AWAY ALL THE TOOLS AND CLEANED UP THE WORK AREA.



## small engine repair

unit: AIR FILTER

capital area career center

module: 7501 02 001 1 7501 02 001 3 date: 10/77 level: I

skill title: AIR FILTER SERVICE

developed & written by: DON FOSTER

visuals by: DAVE WEHRWEIN 131

WORD GUIDE

SERVICE - WORK ON, FIX

CARTRIDGE - SMALL TUBE

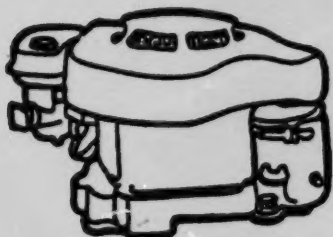
COMPRESSED AIR - AIR UNDER PRESSURE  
GREATER THAN THE AI

SOLVENT - A FLUID WHICH BREAKS UP  
SOMETHING LIKE OIL OR DIRT

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO SERVICE THREE DIFFERENT KINDS OF AIR FILTERS USED  
ON SMALL, AIR-COOLED ENGINES:

1. OIL-BATH TYPE.
2. PAPER-CARTRIDGE TYPE.
3. OIL-FORM TYPE.

AND IN ORDER TO DO THIS YOU WILL NEED:

AN ENGINE WITH AN  
AIR FILTER



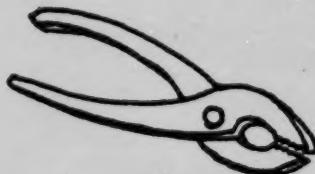
SAFETY GLASSES



COMPRESSED AIR  
GUN



OIL (SUMMERWEIGHT--30W  
OR WINTERWEIGHT - 5W OR 10W)



PLIERS



OIL PAN

RIGHT  
CLEANING  
SOLVENT

"TURN THE PAGE"

WORD GUIDESECURELY - SAFELY; TIGHT ENOUGHWE WILL KNOW YOU CAN DO IT WHEN:

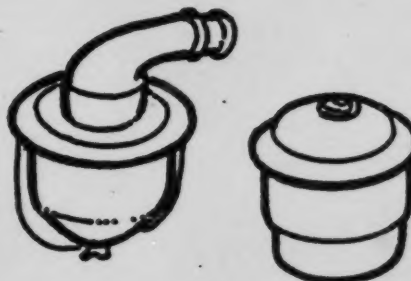
1. YOU HAVE ALL YOUR EQUIPMENT.
2. YOU HAVE REMOVED AND CLEANED EACH KIND OF FILTER.
3. YOU HAVE PUT NEW OIL ON THE FILTER.
4. YOU HAVE PUT THE FILTER BACK SECURELY INTO ITS CONTAINER.

"TURN THE PAGE"

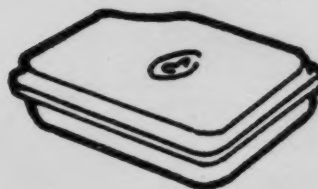
INFORMATION

THERE ARE THREE COMMON KINDS OF AIR FILTERS:

1. OIL-BATH TYPE.



2. OIL-FOAM TYPE.



3. PAPER-CARTRIDGE TYPE.



STUDY THESE PICTURES, AS YOU DO THE JOB STEPS. USE THIS GUIDE TO HELP YOU.

"TURN THE PAGE"



JOB STEPS

READ:

LOOK:

OIL-BATH TYPE

1. GET ALL YOUR EQUIPMENT.  
TAKE IT TO YOUR WORK AREA.



2. PUT ON YOUR SAFETY GLASSES.

3. WITH YOUR HANDS, TAKE OFF THE  
CENTER MOUNTING BOLT OR NUT  
ON TOP OF THE FILTER.



4. TAKE THE WHOLE FILTER FROM  
THE ENGINE.



"TURN THE PAGE"

WORD GUIDEREMOVE - TAKE OFFJOB STEPS

READ:

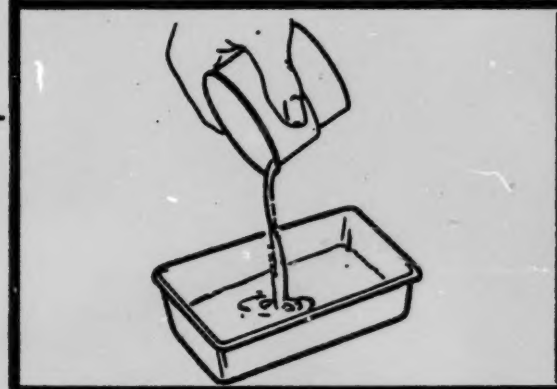
5. REMOVE THE TOP ON THE FILTER BOWL.



LOOK:



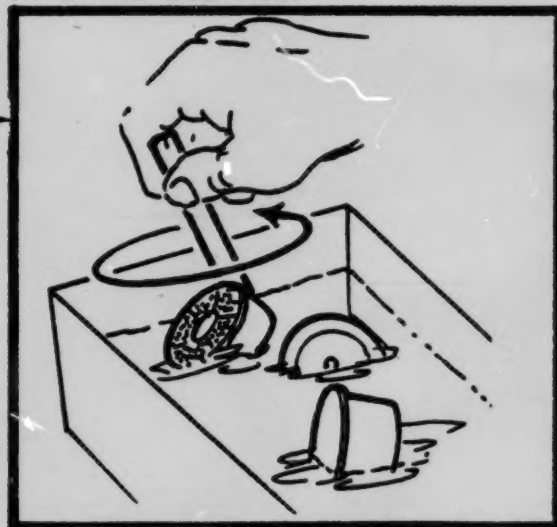
6. INSIDE OF THE BOWL THERE WILL BE DIRTY OIL. POUR THIS DIRTY OIL FROM THE FILTER BOWL INTO AN OIL PAN.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. PUT ON SAFETY GLASSES.
3. REMOVED THE FILTER FROM THE ENGINE.
4. TAKEN THE TOP FROM THE FILTER BOWL.
5. POURED THE DIRTY OIL INTO THE OIL PAN.

7. PUT BOTH PARTS OF THE FILTER IN THE CLEANING SOLVENT AND STIR THE PARTS AROUND.

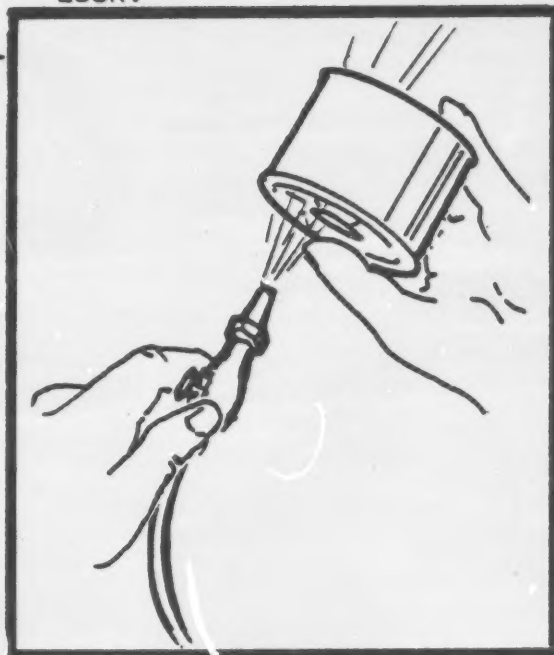


JOB STEPS

READ:

8. WITH YOUR COMPRESSED AIR GUN, BLOW-DRY THE TOP PART OF THE FILTER.

LOOK:



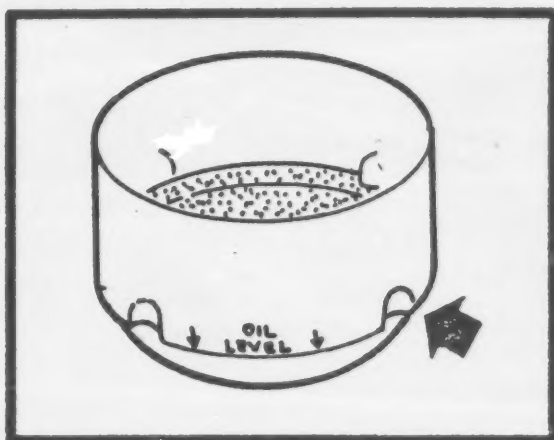
9. THEN TAKE THE LOWER PART OF THE FILTER AND BLOW-DRY IT.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CLEANED BOTH PARTS OF THE FILTER IN THE SOLVENT.
2. BLOWN-DRY THE TOP PART OF THE FILTER.
3. BLOWN-DRY THE LOWER PART OF THE FILTER.

AFTER YOUR INSTRUCTOR HAS CHECKED YOUR WORK, ASK HIM WHAT WEIGHT OIL IS BEING USED IN THE CRANKCASE OF THE ENGINE FROM WHICH YOU HAVE GOTTEN THE FILTER.

10. AFTER YOU FIND OUT, FILL THE BOWL OF THE FILTER WITH THAT WEIGHT OIL (SUMMER: 30W, OR WINTER: 5W OR 10W).



"TURN THE PAGE"

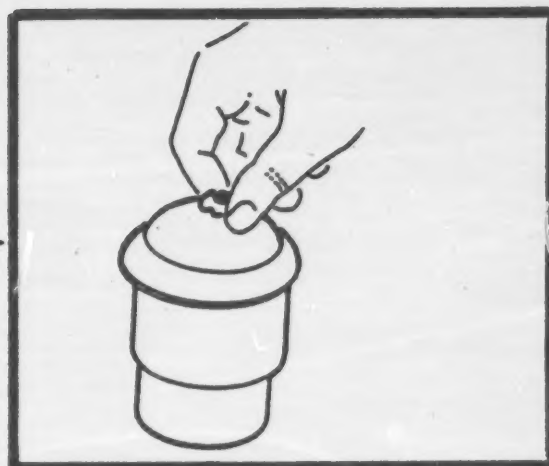
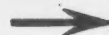
JOB STEPS

READ:

LOOK:

11. PUT THE PARTS BACK IN THE FILTER BOWL.

12. PUT THE WHOLE FILTER BACK ON THE ENGINE. MAKE SURE YOU MAKE THE CENTER MOUNTING NUT TIGHT.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. FILLED THE BOWL WITH THE CORRECT OIL.
2. PUT THE FILTER PIECES TOGETHER IN THE RIGHT WAY.
3. MADE THE CENTER MOUNTING NUT TIGHT ENOUGH TO HOLD THE FILTER ON THE ENGINE.

OIL-FOAM TYPE

1. BE SURE TO PUT ON YOUR SAFETY GLASSES.



"TURN THE PAGE"

JOB STEPS

R

READ:

2. REMOVE THE CENTER MOUNTING  
BOLT OR NUT.

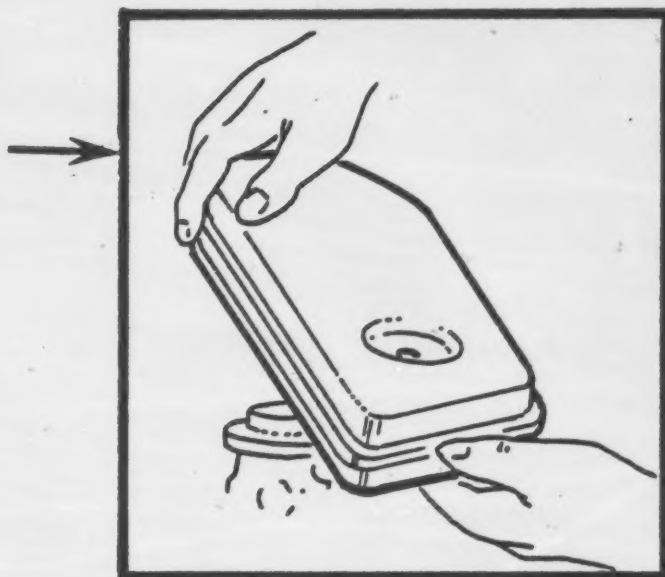
LOOK:



3. IF YOU HAVE A BRIGGS AND  
STRATTON ENGINE, OIL-FOAM TYPE,  
REMOVE THE ENTIRE FILTER.

NOTE: ON A TECUMSEH ENGINE, YOU  
ONLY TOOK OUT THE FILTER ELEMENT.

4. CLEAN THE FILTER IN SOLVENT.

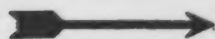


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT ON SAFETY GLASSES.
2. REMOVED THE FILTER.
3. CLEANED THE FILTER IN SOLVENT.

"TURN THE PAGE"



WORD GUIDEDILUTE - MAKE LESS STRONGSATURATE - SOAK, DRENCH, COVER WITHTUCK - FOLD UNDERJOB STEPSREAD:

5. TAKE THE FILTER OUT OF THE CLEANING SOLVENT AND BLOW-DRY THE WHOLE FILTER WITH COMPRESSED AIR.

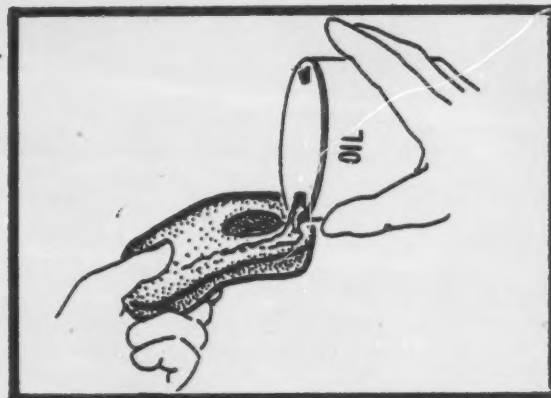
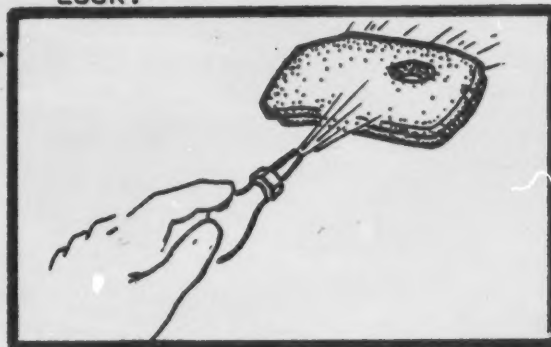
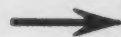
NOTE: BE SURE THE FILTER ELEMENT IS DRY SO THAT THE SOLVENT WON'T DILUTE (OR WEAKEN) THE OIL THAT YOU ARE GOING TO PUT ON THE FILTER ELEMENT.

6. SATURATE (OR SOAK) THE FILTER WITH THE SAME WEIGHT OIL AS USED IN THE CRANKCASE.

NOTE: FOR SUMMER, USE 30W OIL. FOR WINTER, USE 5W OR 10W OIL.

7. ON BRIGGS AND STRATTON FILTERS, PUT THE FILTER ELEMENT IN THE LOWER BODY OF THE FILTER.

NOTE: DO NOT TUCK THE LIP OF THE ELEMENT INTO THE FILTER BODY. IT MUST HANG OUTSIDE OF THE BODY TO SEAL THE TOP OF THE FILTER.

LOOK:

"TURN THE PAGE"

JOB STEPS

## READ:

8. FOR THE BRIGGS AND STRATTON ENGINE, PUT THE COVER ON THE LOWER FILTER BODY.

## LOOK:



9. PUT THE FILTER ON THE CARBURETOR AND TIGHTEN THE SCREW OR NUT SO THE FILTER IS TIGHT.



NOTE: ON TECUMSEH ENGINES, THE STEPS ARE A LITTLE DIFFERENT (STEPS 7 - 9 FOR BRIGGS AND STRATTON). HERE'S WHAT YOU DO: PUT THE FILTER ELEMENT INTO THE FILTER BODY AND SNAP THE COVER IN PLACE.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. BLOWN-DRY ALL OF THE CLEANING SOLVENT OUT OF THE FILTER.
2. SATURATED THE FILTER WITH THE RIGHT OIL.
3. PUT THE FILTER OR ELEMENT INTO THE FILTER BODY.
4. REPLACED FILTER ON THE CARBURETOR RIGHT SO IT'S TIGHT ENOUGH.

PAPER-CARTRIDGE TYPE

1. ON A BRIGGS AND STRATTON ENGINE, REMOVE THE CENTER FILTER NUT (SOME TECUMSEH ENGINES USE A CLAMP. IF THAT'S THE KIND YOU HAVE, USE A PAIR OF PLIERS TO REMOVE THE CLAMP).



"TURN THE PAGE"

WORD GUIDE

NON-SUDSING - DOES NOT MAKE  
SOAPY SUDS

DETERGENT - CLEANING POWDER OR  
FLUID

JOB STEPSREAD:

2. TAKE OFF THE FILTER COVER, IF IT HAS ONE (IF IT IS A TECUMSEH TYPE FILTER, IT IS HELD ON WITH A CLAMP AND THERE WILL NOT BE A COVER).

3. REMOVE THE FILTER ELEMENT AND TAP IT ON YOUR BENCH. THIS WILL SHAKE LOOSE SOME PIECES OF DIRT WHICH MAY BE IN THE FILTER.

4. TAKE THE FILTER IN YOUR HANDS AND, WITH A COMPRESSED AIR GUN, BLOW IT OUT FROM THE INSIDE OF THE FILTER (OR YOU CAN WASH IT OUT IN A NON-SUDSING DETERGENT AND SET IT OUT TO DRY).

LOOK:

"TURN THE PAGE"

JOB STEPS

READ:

5. AFTER YOU'VE CLEANED IT, HOLD THE FILTER UP TO A LIGHT AND CHECK FOR HOLES IN THE PAPER (OR YOU COULD PUT A LIGHT ON THE INSIDE OF FILTER TO SHOW UP ANY RIPS OR TEARS).

LOOK:

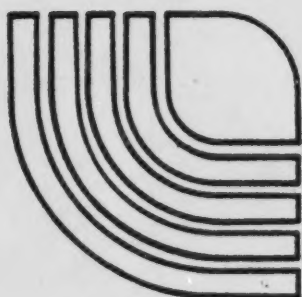
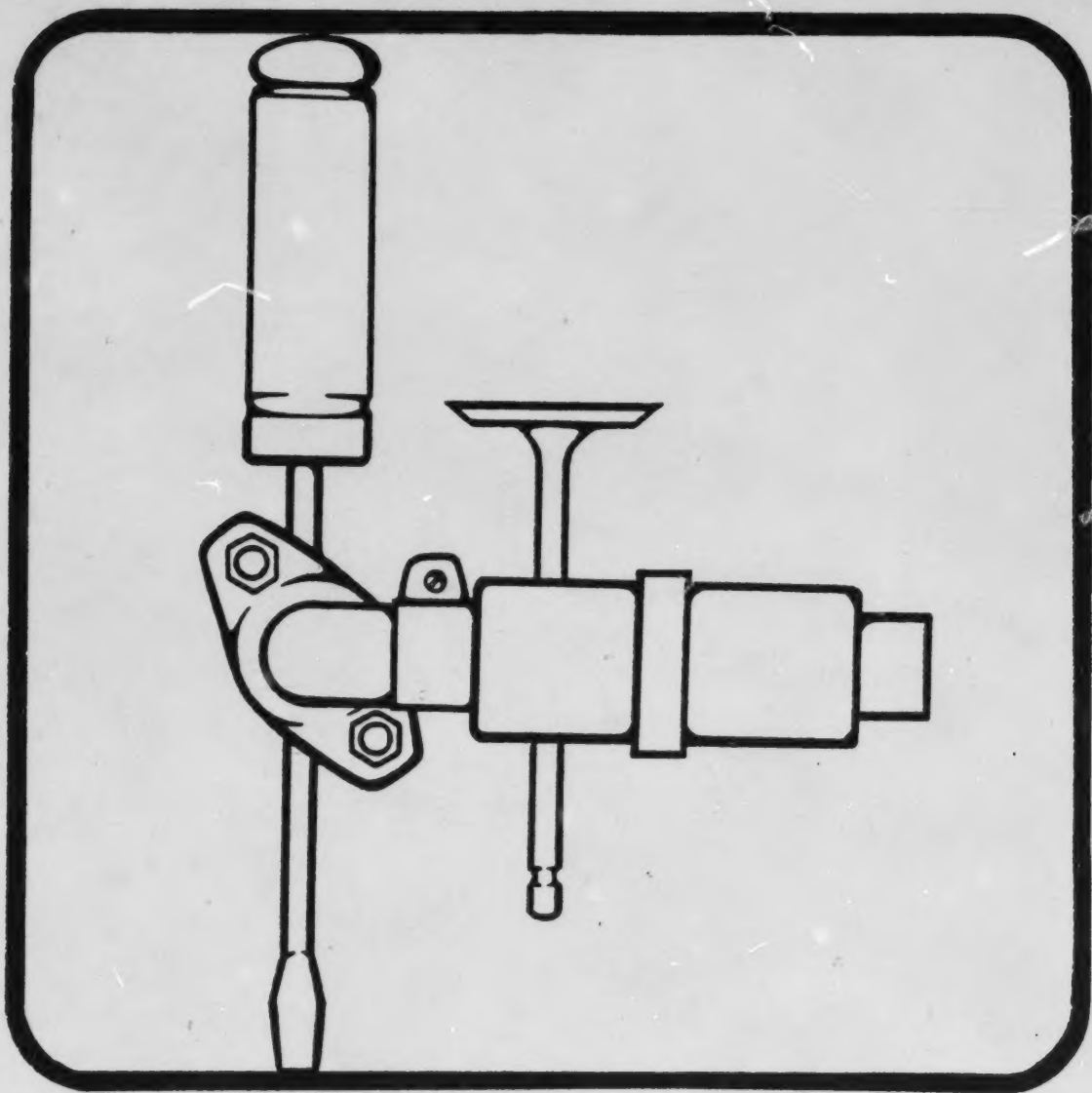


6. IF THE FILTER ELEMENT IS CLEAN AND HAS NO HOLES, PUT THE FILTER BACK ON THE ENGINE (IF THERE ARE HOLES OR THE FILTER IS NOT CLEAN, GET A NEW ONE FROM THE PARTS DEPARTMENT).

7. PUT THE CLAMP OR THE CENTER MOUNTING NUT ON TOP OF THE FILTER AND MAKE SURE IT IS TIGHT ENOUGH ON THE ENGINE.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OFF THE FILTER COVER.
2. CLEANED THE FILTER IN THE RIGHT WAY.
3. CHECKED IT FOR HOLES.
4. PUT THE FILTER BACK ON THE ENGINE IN THE RIGHT WAY.



## small engine repair

unit: AIR FILTERS

capital area career center

module: 7501 02 002 1  
7501 02 002 3 date: DECEMBER 1977 level: I

skill title: CHECK FOR AIR BY-PASSING THE AIR FILTER

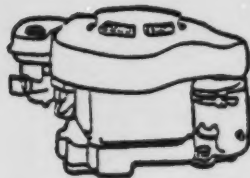
developed & written by: JACK HELDER

visuals by: STEVE BRAMER



WORD GUIDEBY-PASS - GO BY, GO PASTPERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

1. HOW TO FIND PLACES WHERE AIR MAY BY-PASS AIR FILTERS.
2. HOW TO FIX THOSE PLACES.

AND IN ORDER TO DO THIS YOU WILL NEED:

AN ENGINE WITH AN  
AIR FILTER



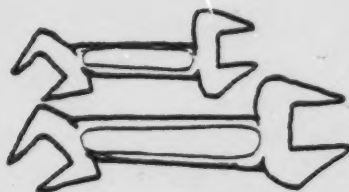
SAFETY GLASSES



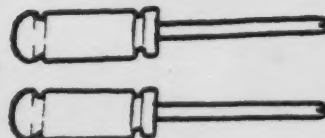
LUBRICATING OIL  
OR GREASE



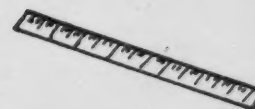
SOCKET SET



OPEN-END WRENCH SET



SCREWDRIVER  
SET



STRAIGHT EDGE  
RULER

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE ALL YOUR EQUIPMENT.
2. YOU CAN TELL WHEN AIR IS BY-PASSING THE AIR FILTER.
3. YOU CAN FIX THIS RIGHT.

"TURN THE PAGE"

### INFORMATION

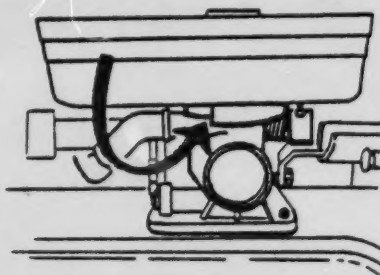
IF AIR BY-PASSES THE AIR FILTER, DIRT AND DUST WILL GET INTO THE ENGINE. THIS ISN'T VERY GOOD FOR THE ENGINE BECAUSE:

1. THE ENGINE WILL RUN HOTTER.
2. SOME PARTS COULD BE RUINED.

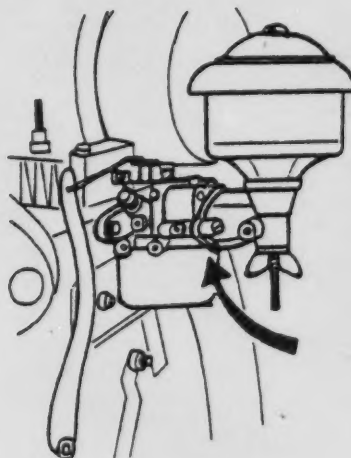
SO YOU MUST CHECK THE FILTER MOUNTS AND GASKETS FOR ANY AIR BY-PASS.

THERE ARE DIFFERENT KINDS OF FILTERS BUT REMEMBER, ALL AIR FILTERS HAVE A GASKET OF SOME KIND BETWEEN THE FILTER AND THE CARBURETOR.

LOOK AT THE PICTURE BELOW. IT SHOWS YOU AN ENGINE THAT IS LIKE A BRIGGS AND STRATTON. ON THIS KIND OF ENGINE, THE GASKET IS USUALLY RUBBER AND FITS ON THE CARBURETOR.



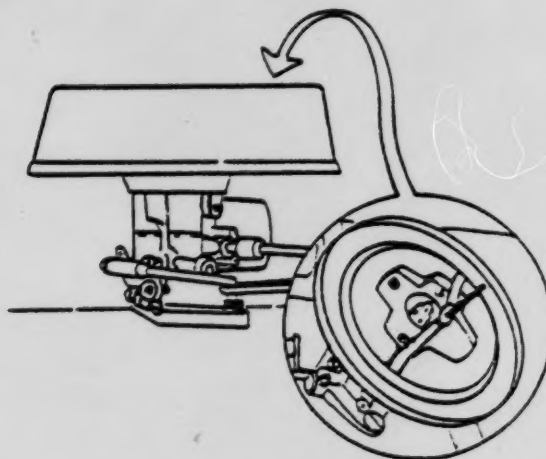
SOME ENGINES HAVE AIR FILTERS HOOKED OR MOUNTED TO AN AIR HORN. SEE, LIKE THE PICTURE BELOW. IN THIS PICTURE, A GASKET IS BETWEEN THE AIR HORN AND THE CARBURETOR.



"TURN THE PAGE"

INFORMATION

SOME ENGINES USE A LIGHT METAL COVER HOOKED TO THE CARBURETOR. THERE MAY BE TWO OR THREE SCREWS TO HOLD THE COVER ONTO THE CARBURETOR. SEE THE PICTURE BELOW. WHEN YOU TAKE OFF THE COVER, YOU CAN CHECK THE GASKET. THERE MAY BE A GASKET AROUND THE EDGE OF THE COVER.



NOW, READ ALL THE JOB STEPS FOR THIS MOD. USE THE JOB STEPS THAT APPLY TO THE TYPE OF ENGINE ON WHICH YOU ARE WORKING.

"TURN THE PAGE"

WORD GUIDEWARPED - BENT ALL OVERJOB STEPS

READ:

1. GET ALL YOUR EQUIPMENT AND TAKE IT TO YOUR WORK AREA.



LOOK:



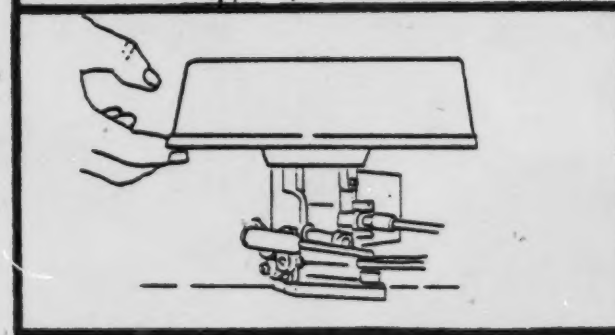
2. PUT ON YOUR SAFETY GLASSES.



NOTE: IF YOUR ENGINE IS THE KIND WITH A LIGHT COVER, GO TO STEP 3. IF IT HAS AN AIR HORN TYPE, GO TO STEP 10. IF IT HAS THE BRIGGS AND STRATTON TYPE, GO TO STEP 14.



3. FOR FILTERS THAT ARE HELD TO THE CARBURETOR BY A LIGHT COVER, MAKE SURE THE FILTER COVER EDGE FITS FIRMLY AROUND THE RIM. IF BENT OR WARPED, REPLACE IT.



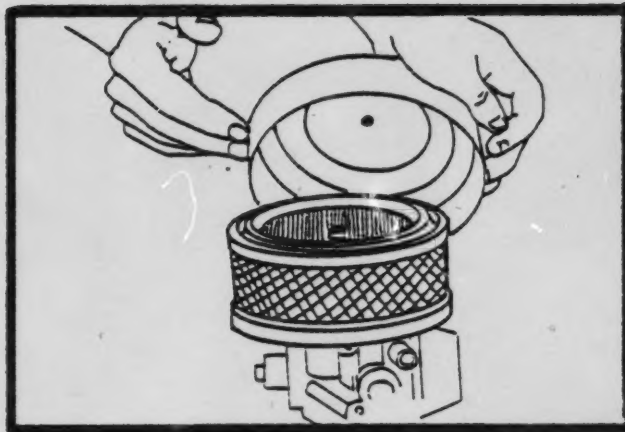
JOB STEPS

READ:

4. REMOVE THE FILTER HOUSING COVER BY REMOVING THE WING NUT.



LOOK:

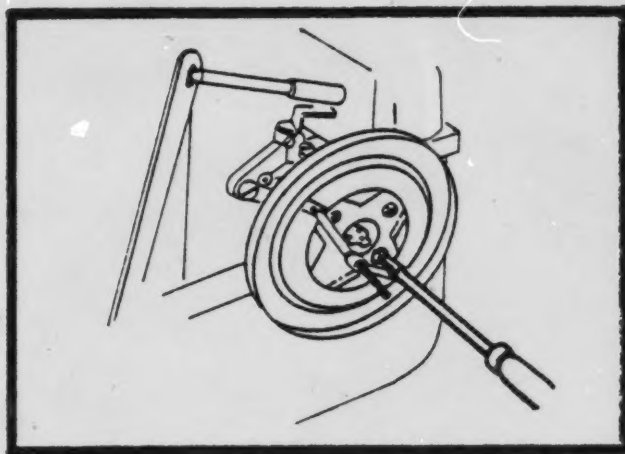


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL YOUR EQUIPMENT.
2. PUT ON SAFETY GLASSES.
3. CHECKED THE COVER FOR WARPS
4. REPLACED THE COVER, IF NEEDED.

5. CLEAN THE FILTER INSIDE AS YOU YOU LEARNED IN MODULE 7501 02 001.

6. REMOVE THE BASE OF THE FILTER HOUSING FROM THE CARBURETOR. USE A SCREWDRIVER. DO NOT LOSE THE SCREWS OR WASHERS.





JOB STEPS

READ:

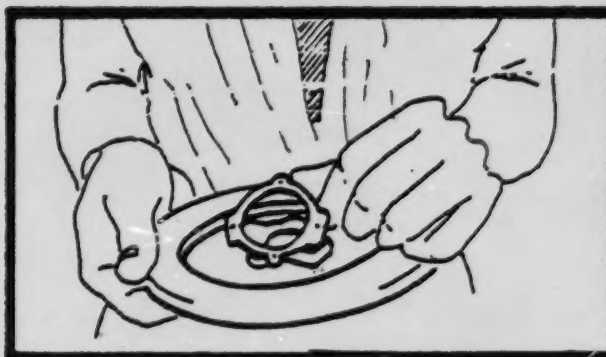
7. USING A RULER, CHECK THE FILTER HOUSING BASE FOR WARPS.



LOOK:



8. CHECK THE GASKET FOR CRACKS OR BREAKS. IF YOU FIND ANY CRACKS OR BREAKS, PUT ON A NEW GASKET.



9. IF THE OLD GASKET IS GOOD, PUT A LIGHT COATING OF OIL OR GREASE ON IT.

"TURN THE PAGE"

JOB STEPS

READ:

10. THEN PUT OIL OR GREASE AROUND THE EDGE OF THE AIR FILTER. WITH YOUR SCREWDRIVER, REPLACE THE COVER.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OFF THE COVER.
2. CLEANED THE FILTER.
3. CHECKED THE GASKET
4. PUT LUBRICATING FLUID ON GASKET AND THE EDGE OF THE AIR FILTER.
5. PUT THE COVER BACK ON.

11. IF YOUR CARBURETOR HAS THE AIR FILTER HOOKED TO THE AIR HORN, CHECK THE COVER OF THE FILTER FOR WARPS OR DENTS AROUND THE EDGE.



12. IF THE COVER IS WARPED OR BENT, GET A NEW COVER.



"TURN THE PAGE"

JOB STEPS

READ:

13. REMOVE THE AIR FILTER FROM THE AIR HORN.



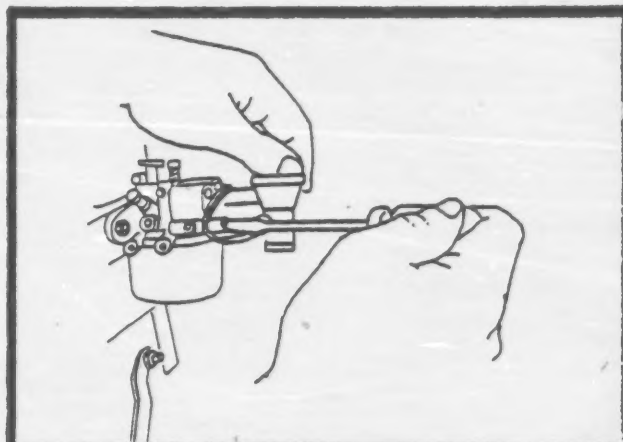
LOOK:



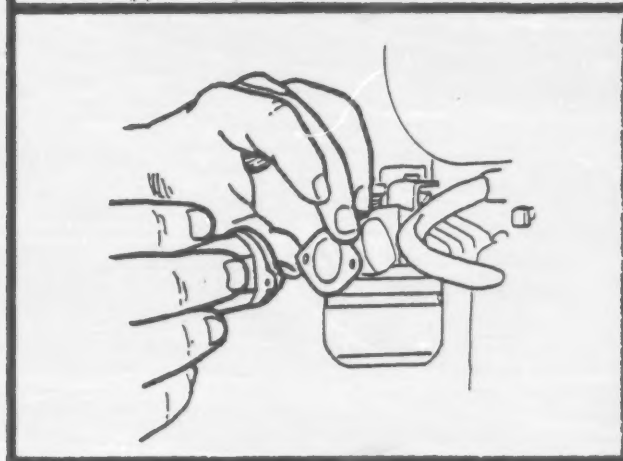
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE AIR HORN COVER FOR WARPS OR DENTS.
2. IF NEEDED, PUT ON A NEW COVER.
3. REMOVED THE AIR FILTER.

14. WITH YOUR SCREWDRIVER, REMOVE THE AIR HORN.



15. CHECK THE GASKET BETWEEN THE AIR HORN AND THE CARBURETOR FOR CRACKS OR BREAKS IN THE GASKET. IF THERE ARE ANY, PUT ON A NEW GASKET.



JOB STEPS

READ:

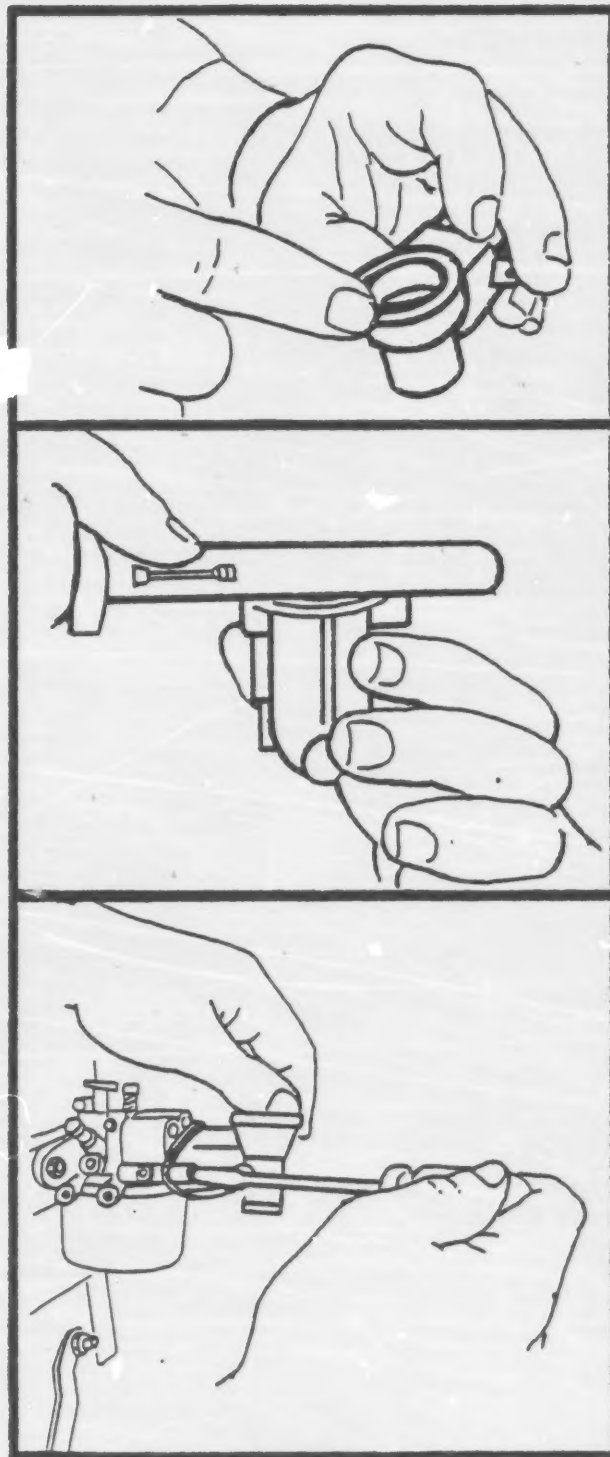
16. NOW FIND THE GASKET (OR AN O-RING) BETWEEN THE AIR HORN AND FILTER. CHECK IT.

17. IF THE GASKET IS GOOD, PUT A LIGHT COATING OF OIL OR GREASE ON THE SURFACE WHERE THE GASKET FITS. THEN REPLACE THE GASKET.

18. USE YOUR STRAIGHT-EDGE TO CHECK THE AIR HORN FOR WARPS. EACH EDGE SHOULD BE FLAT.

19. WITH YOUR SCREWDRIVER, PUT THE AIR HORN BACK ON THE CARBURETOR.

LOOK:



"TURN THE PAGE"

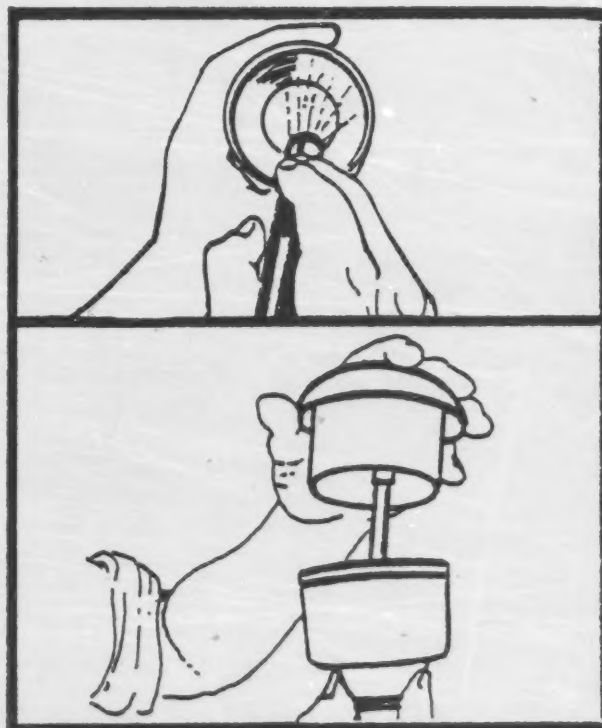
JOB STEPS

READ:

20. CLEAN AND CHECK THE AIR FILTER  
AS YOU LEARNED IN MOD 7501 02 001.



LOOK:



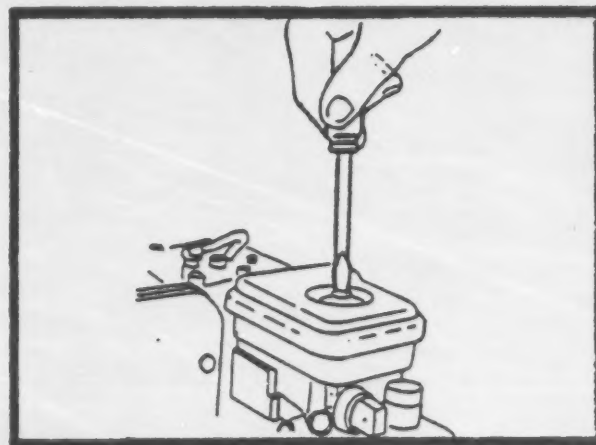
21. PUT THE AIR FILTER BACK ON.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE AIR HORN.
2. CHECKED THE GASKET FOR CRACKS OR BREAKS.
3. LUBRICATED THE SURFACE WHERE THE GASKET FITS.
4. PUT THE GASKET BACK ON THE CARBURETOR.
5. CHECKED THE AIR HORN AND PUT IT BACK RIGHT.
6. CLEANED AND CHECKED THE AIR FILTER RIGHT.
7. PUT THE COVER BACK ON.

22. IF YOU HAVE A BRIGGS AND  
STRATTON TYPE OF AIR FILTER,  
REMOVE THE AIR FILTER UNIT  
BY MAKING THE CENTER BOLT LOOSE  
WITH YOUR SCREWDRIVER.



"TURN THE PAGE"



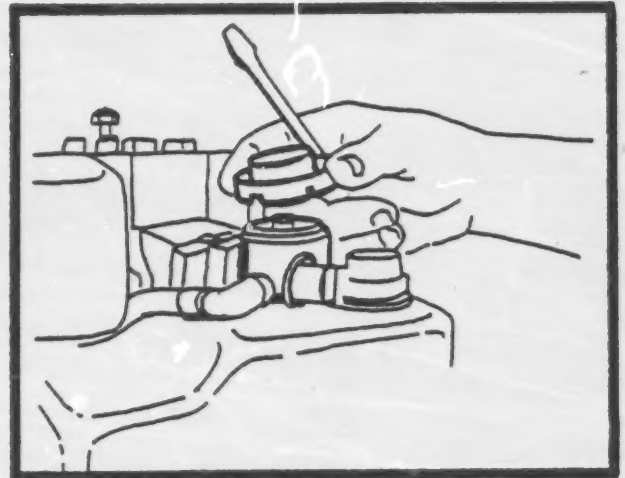
JOB STEPS

READ:

23. CHECK THE LARGE RUBBER GASKET FOR CRACKS OR BREAKS. IF THERE ARE ANY, PUT ON A NEW GASKET.



LOOK:



24. TAKE A LOOK AT THE AIR FILTER. IF IT'S CLEAN ENOUGH, IT'S OK TO USE AGAIN. IF NOT, CLEAN AS YOU LEARNED IN MOD 7501 02 001.

25. LIGHTLY OIL OR GREASE THE GASKET.



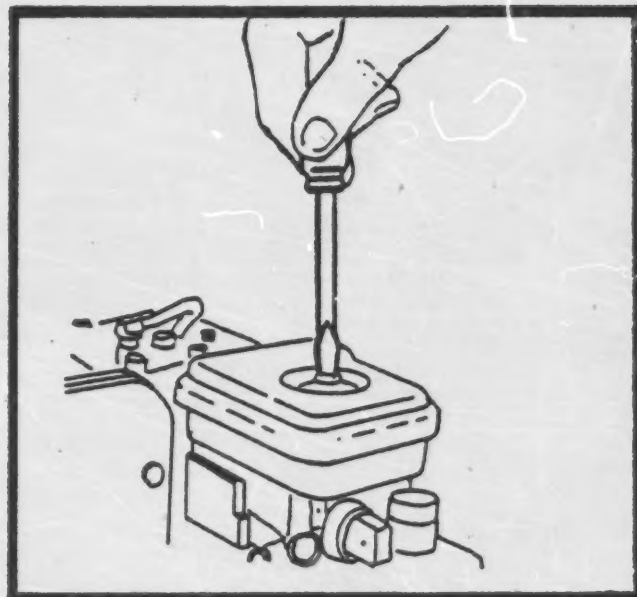
"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

26. WITH YOUR SCREWDRIVER, PUT THE FILTER UNIT BACK ON THE CARBURETOR.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE AIR FILTER UNIT.
2. CHECKED THE LARGE RUBBER GASKET.
3. LUBRICATED THE GASKET.
4. REPLACED THE AIR FILTER HOUSING.
5. AN UNDERSTANDING OF HOW YOU SERVICED THE AIR FILTER AND HOW YOU SEALED IT.



## small engine repair

unit: STARTERS

capital area career center

module: 7501 03 001 1  
7501 03 001 3 date: 10/77 level: I

skill title: REMOVE AND REPLACE STARTER

developed & written by: DWIGHT SMITH

visuals by: DAVE WEHRWEIN

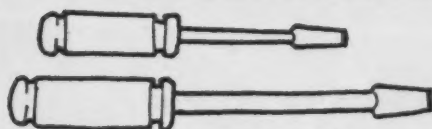
WORD GUIDE

ASSEMBLY - A PART THAT IS MADE  
UP OF SMALLER PARTS

SPECIFICATIONS - GUIDELINES; RULES

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

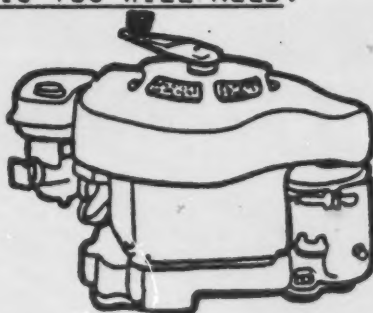
HOW TO REMOVE AND REPLACE A WIND-UP STARTER ASSEMBLY  
ON A SMALL ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:

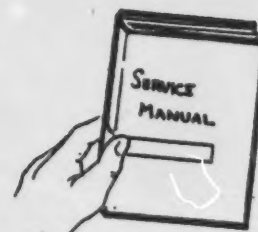
HAND TOOLS



SAFETY GLASSES



ENGINE



SERVICE MANUAL

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED ALL THE EQUIPMENT FOR THIS MODULE.
2. YOU HAVE REMOVED THE STARTER ASSEMBLY.
3. YOU HAVE PUT THE STARTER ASSEMBLY BACK ON THE ENGINE AND IT WORKS ACCORDING TO THE SERVICE MANUAL SPECIFICATIONS.
4. YOU HAVE PUT AWAY THE EQUIPMENT AND CLEANED UP THE WORK AREA.

"TURN THE PAGE"

WORD GUIDEREMOVE - TAKE OFF OF OR OUTJOB STEPS

READ:

LOOK:

1. GATHER THE EQUIPMENT AND GO TO THE WORK AREA.

2. USE A WRENCH AND REMOVE THE BOLTS HOLDING THE BLOWER HOUSING (THERE ARE USUALLY 3 OR 4 BOLTS). WEAR YOUR SAFETY GLASSES.



3. LIFT THE BLOWER HOUSING OFF THE ENGINE AND PUT IT ON A WORK BENCH.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL THE EQUIPMENT YOU NEED.
2. REMOVED THE BLOWER HOUSING.
3. LIFTED BLOWER HOUSING OFF THE ENGINE AND PUT IT ON A WORK BENCH.
4. YOUR SAFETY GLASSES ON.

"TURN THE PAGE"



WORD GUIDEFRAYED - SPLITTINGJOB STEPS

READ:

4. IF THE ENGINE HAS A ROPE RE-WIND STARTER, SLOWLY PULL OUT THE ROPE. LOOK CAREFULLY AT THE ROPE; IF IT IS WORN OR FRAYED, TELL YOUR INSTRUCTOR.

LOOK:



5. LET GO OF THE ROPE. IF IT GOES BACK INTO THE STARTER, IT IS WORKING PROPERLY. IF THE ROPE DOES NOT GO BACK IN, TELL YOUR INSTRUCTOR THAT IT IS BROKEN.

6. PUT THE STARTER HOUSING BACK ON THE ENGINE.



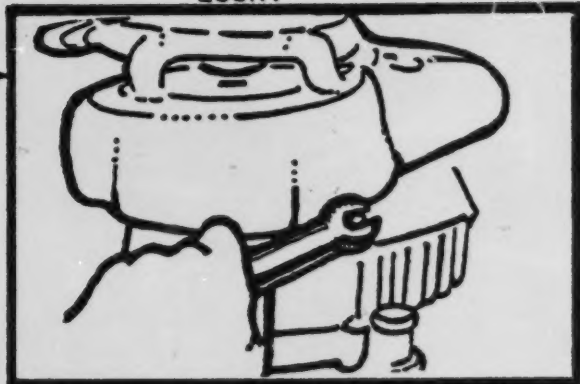
"TURN THE PAGE"

JOB STEPS

READ:

7. PUT THE BOLTS BACK IN AND  
BE SURE THEY ARE TIGHT.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE ROPE ON ROPE-TYPE STARTERS.
2. CHECKED THE REWIND OF ROPE STARTERS.
3. PROPERLY PUT THE STARTER HOUSING BACK ON THE ENGINE.
4. TIGHTENED THE BOLTS.

8. FOR WIND-UP STARTERS:  
PUT THE LEVER ON "WIND" OR  
"CRANK".



9. WIND UP THE STARTER AND  
"RELEASE" IT OR MOVE THE LEVER  
TO "START".

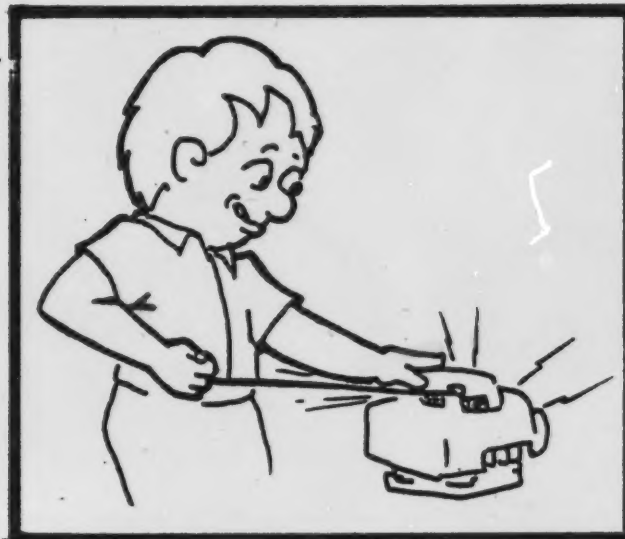
"TURN THE PAGE"

JOB STEPS

READ:

10. PULL ROPE STARTER AND SEE  
IF IT WORKS RIGHT.

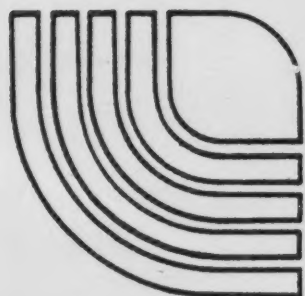
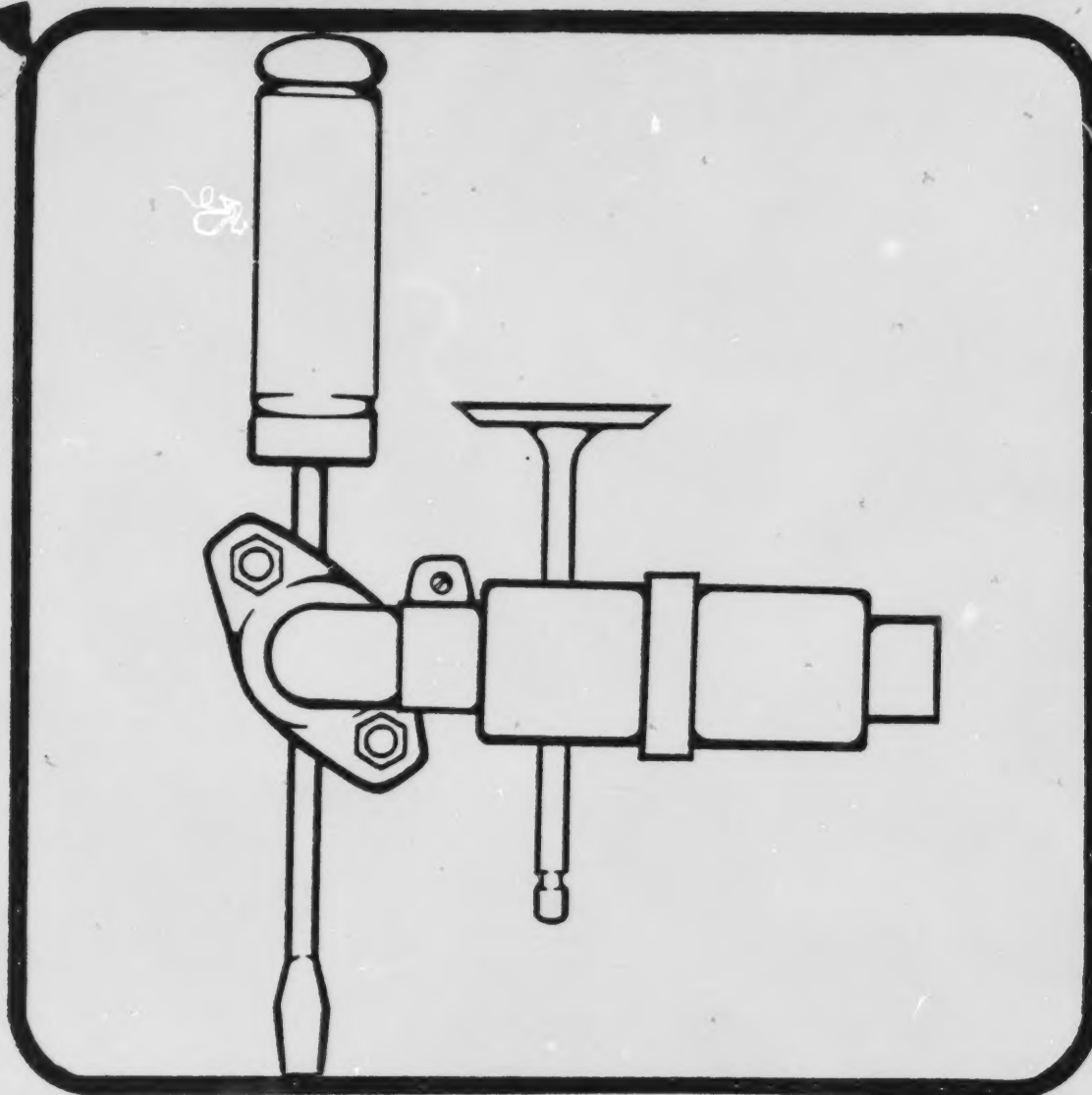
LOOK:



11. PUT AWAY ALL EQUIPMENT AND  
CLEAN UP THE WORK AREA.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT LEVER ON "WIND" OR "CRANK" FOR WIND-UP STARTER.
2. TESTED THE WIND-UP OR ROPE STARTER SO IT WORKS PROPERLY.



## small engine repair

unit: STARTERS

capital area career center

module: 7501 03 002 1 7501 03 002 3 date: MAY 1978 level: I

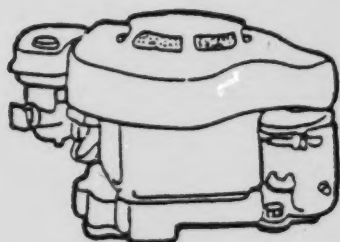
skill title: REPLACE RECOIL SPRINGS

developed & written by: JACK HELDER

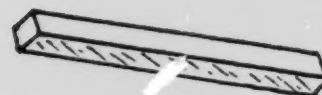
visuals by: \_\_\_\_\_

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REPLACE RECOIL SPRING ON A BRIGGS & STRATTON REWIND STARTER.

AND IN ORDER TO DO THIS YOU WILL NEED:

A BRIGGS & STRATTON ENGINE  
WITH A REWIND STARTER



3/4" SQUARE PIECE OF METAL



HAND TOOLS



SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED YOUR EQUIPMENT.
2. YOU CAN REPLACE A WORN OR BROKEN RECOIL SPRING.
3. YOU CAN REPLACE THE STARTER ROPE, IF IT IS WORN OR BROKEN.

"TURN THE PAGE"

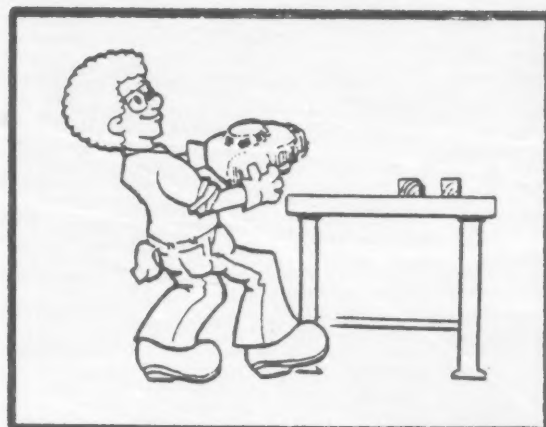


JOB STEPS

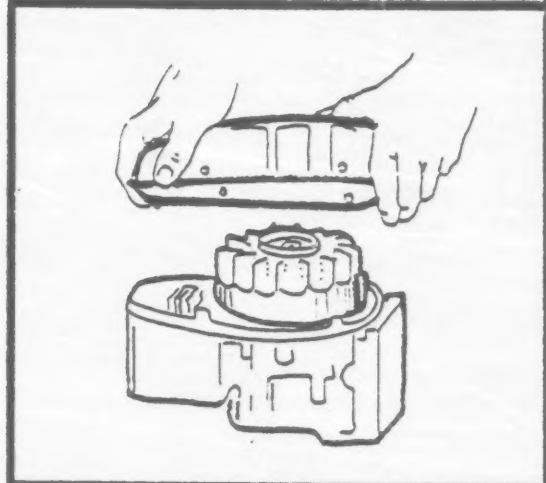
READ:

LOOK:

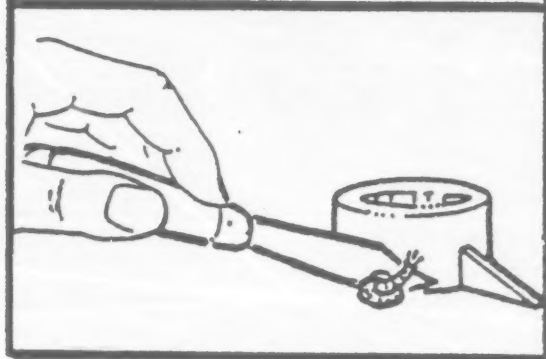
1. TAKE ALL EQUIPMENT TO YOUR WORK AREA. WEAR YOUR SAFETY GLASSES.



2. REMOVE THE BLOWER HOUSING FROM THE ENGINE.



3. CUT THE KNOT IN THE ROPE AT THE END OF THE STARTER PULLEY. REMOVE THE ROPE.

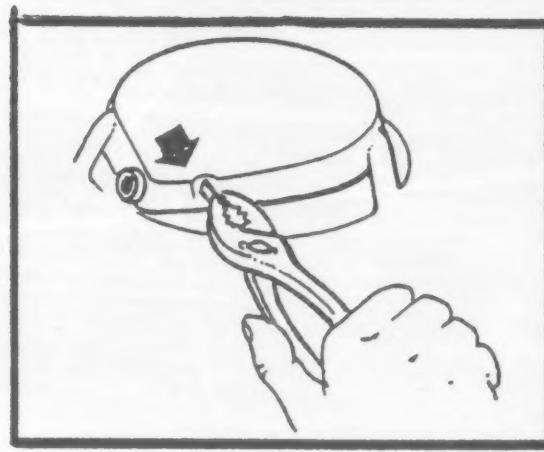


JOB STEPS

READ:

4. PULL OUT THE OUTER END OF THE STARTER SPRING AS FAR AS IT WILL GO.

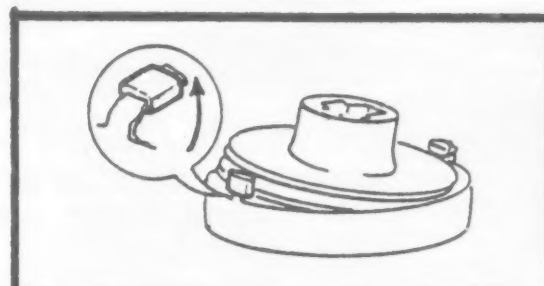
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. YOUR SAFETY GLASSES ON.
2. REMOVED THE BLOWER HOUSING.
3. CUT THE KNOT IN THE ROPE AND REMOVED THE ROPE.
4. PULLED OUT THE OUTER END OF THE STARTER SPRING AS FAR AS IT WILL GO.

5. BEND UP ONE OF THE NYLON BUMPER TANGS AND LIFT OUT THE STARTER PULLEY.



6. REMOVE THE SPRING FROM THE PULLEY.



7. CLEAN THE STARTER SPRING, IF IT IS NOT BROKEN.

JOB STEPS

READ:

LOOK:

8. CLEAN THE PULLEY. WIPE IT BY PULLING A RAG THROUGH THE PULLEY.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE PULLEY FROM THE BLOWER HOUSING.
2. REMOVED THE SPRING FROM THE PULLEY.
3. CLEANED THE SPRING, IF IT WAS NOT BROKEN.
4. CLEANED THE PULLEY BY PULLING A RAG THROUGH IT.

9. PUT A SMALL AMOUNT OF GREASE ON THE INNER FACE OF THE PULLEY.



10. STRAIGHTEN THE SPRING SO IT WILL BE EASY TO PUT IN.

"TURN THE PAGE"

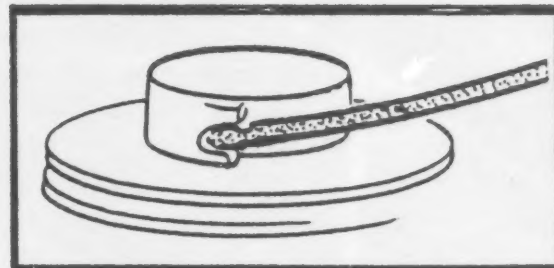
JOB STEPS

READ:

11. PUT ONE END OF THE SPRING IN THE STARTER HOUSING AND HOOK IT INTO THE SLOT.



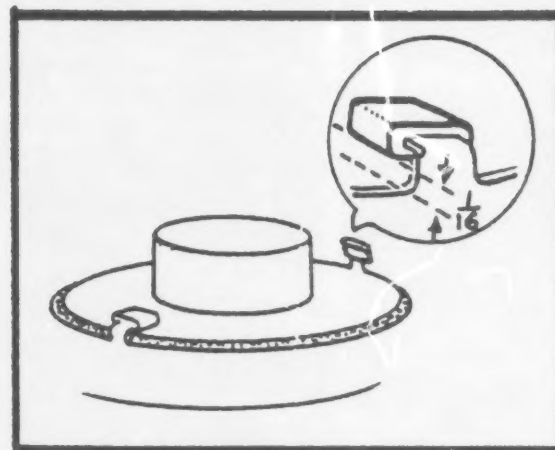
LOOK:



12. REPLACE THE NYLON BUMPERS, IF THEY ARE WORN.

1. PUT THE PULLEY INTO THE BLOWER HOUSING AND BEND THE TANG DOWN.

NOTE: PULLEY SHOULD BE  $\frac{1}{16}$ TH OF AN INCH FROM THE HOUSING.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT GREASE ON THE PULLEY FACE.
2. STRAIGHTENED THE SPRING.
3. HOOKED ONE END OF THE SPRING INTO THE SLOT IN THE STARTER HOUSING.
4. REPLACED ANY WORN NYLON BUMPERS.
5. PUT THE PULLEY INTO THE HOUSING AND BENT DOWN THE TANG.

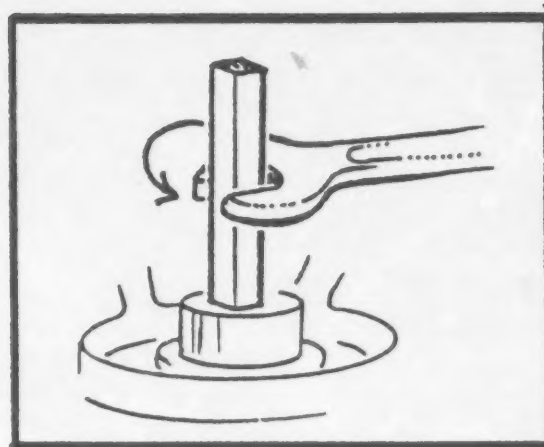
"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

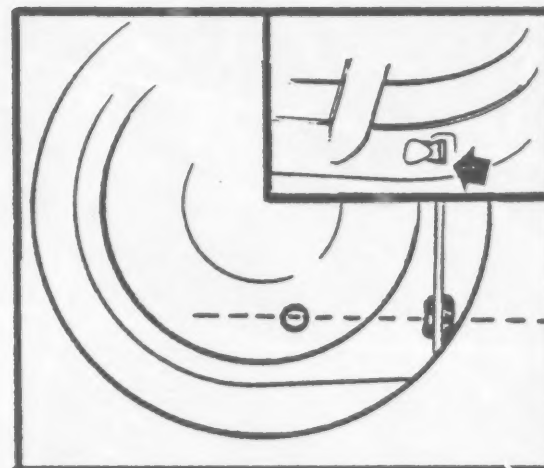
14. PUT A 3/4 INCH SQUARE PIECE OF METAL INTO THE CENTER OF THE PULLEY HUB.



15. WIND THE SPRING COUNTER-CLOCKWISE UNTIL THE SPRING IS WOUND TIGHT.



16. THEN LOOSEN THE PULLEY ONE TURN SO THAT THE HOLE IN THE PULLEY FOR THE ROPE KNOT LINES UP WITH THE EYELET IN THE BLOWER HOUSING.



NOTE: BE SURE THE SPRING IS LOCKED IN THE TAPERED PART OF THE HOLE.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. WOUND UP THE SPRING.
2. LOOSENED THE SPRING ONE TURN.
3. LINED UP THE HOLE IN THE PULLEY WITH THE EYELET IN THE BLOWER HOUSING.
4. MADE SURE THE SPRING IS LOCKED IN THE TAPERED PART OF THE HOLE.

"TURN THE PAGE"



JOB STEPS

READ:

LOOK:

17. GET A NEW STARTER ROPE, IF THE OLD ONE IS WORN.

18. PUT WIRE AROUND ONE END OF THE STARTER ROPE.



19. GUIDE THE ROPE THROUGH THE EYELET IN THE HOUSING AND THE HOLE IN THE PULLEY.



20. TAKE OFF THE WIRE. THEN TIE A KNOT IN THE ROPE SO IT WILL NOT GO BACK THROUGH THE HOLE.



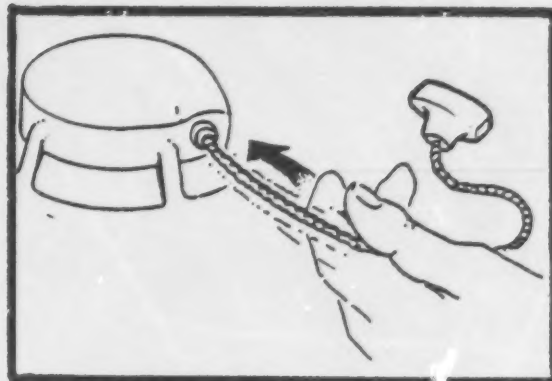
"TURN THE PAGE"

JOB STEPS

READ:

21. RELEASE THE PULLEY. THE ROPE WILL WIND INTO THE PULLEY AND HOUSING ASSEMBLY.

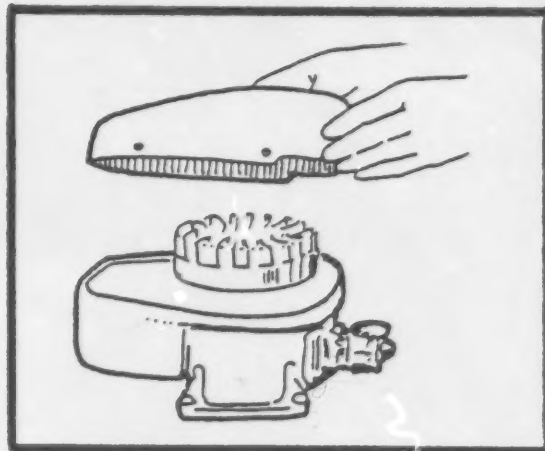
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

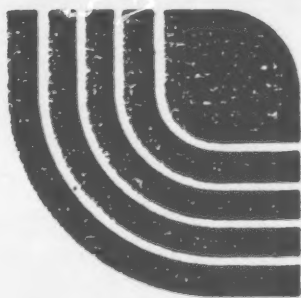
1. REPLACED THE ROPE, IF NEEDED.
2. WOUND THE STARTER ROPE BACK INTO THE HOUSING.

22. REPLACE THE BLOWER HOUSING.



23. CLEAN UP YOUR WORK AREA.

CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK.



## small engine repair

unit: STARTERS

capital area career center

module: 7501 03 003 1 7501 03 003 3 date: 9/77 level:       

skill title: REMOVE AND REPLACE STARTER CLUTCHES

developed & written by: D. CONSTANTINI

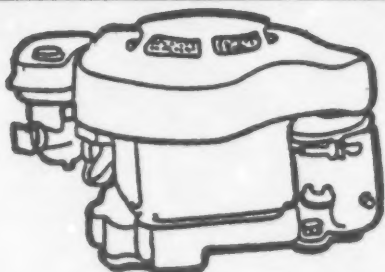
visuals by: DAVE WEHRWEIN

PERFORMANCE OBJECTIVE

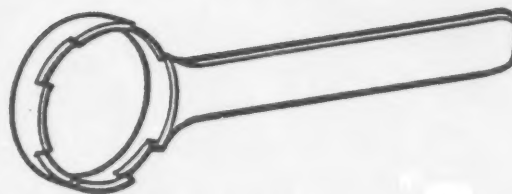
YOU ARE GOING TO LEARN:

HOW TO TAKE APART LATE MODEL STARTER CLUTCHES ON A BRIGGS & STRATTON ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:



BRIGGS & STRATTON  
ENGINE WITH STARTER  
CLUTCHES



BRIGGS & STRATTON TOOL #19114



BRIGGS & STRATTON MANUAL



SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

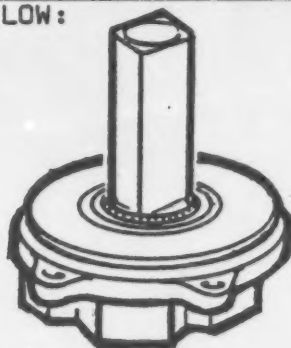
YOU HAVE GATHERED ALL YOUR EQUIPMENT

YOU CAN TAKE APART AND PUT BACK TOGETHER THE BRIGGS & STRATTON LATE MODEL STARTER CLUTCHES.

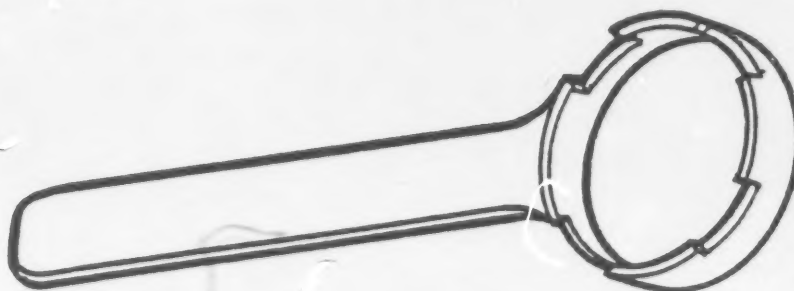
"TURN THE PAGE"

### INFORMATION

BRIGGS & STRATTON MAKE AN EARLY AND LATE MODEL STARTER CLUTCH ASSEMBLY. THIS MODULE WILL TEACH YOU HOW TO SERVICE THE LATE MODEL CLUTCH ASSEMBLY. IF YOU HAVE AN EARLY MODEL, LOOK AT PAGE 58 OF THE SMALL ENGINE SERVICE MANUAL. THE LATE MODEL CLUTCH LOOKS LIKE THE PICTURE BELOW:



TO SERVICE THE CLUTCH, YOU NEED A SPECIAL BRIGGS & STRATTON TOOL #19114.



"TURN THE PAGE"



JOB STEPS

READ:

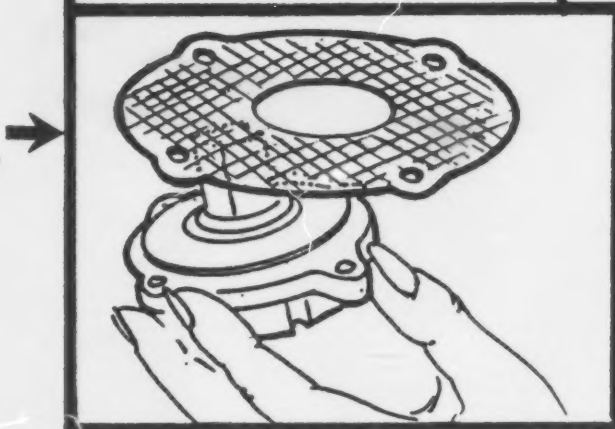
LOOK:

1. GET ALL EQUIPMENT AND TAKE IT TO YOUR WORK AREA.

2. IF CLUTCH ASSEMBLY IS MOUNTED ON AN ENGINE, TAKE OFF THE BLOWER HOUSING. WEAR YOUR SAFETY GLASSES.



3. TAKE OFF ROTATING SCREEN, STARTER RATCHET COVER, AND SEAL. THESE PARTS ARE BOLTED TO THE CLUTCH HOUSING.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

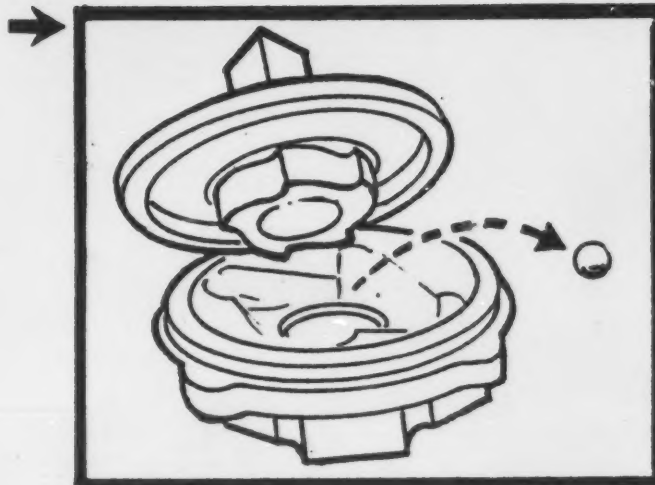
1. ALL EQUIPMENT
2. TAKEN OFF THE BLOWER HOUSING.
3. TAKEN OFF ROTATING SCREEN, STARTER, RATCHET COVER AND SEAL.
4. YOUR SAFETY GLASSES ON.

"TURN THE PAGE"

READ:

LOOK:

4. LIFT RATCHET FROM HOUSING  
AND TAKE OUT STEEL BALLS.



5. HOLD THE FLYWHEEL AND  
UNSCREW THE HOUSING. TO  
UNSCREW HOUSING, USE THE  
BRIGGS & STRATTON TOOL  
#19114 AND TURN IT TO THE  
LEFT.

6. CHECK TO SEE IF THE  
STARTER RATCHET, HOUSING AND  
STEEL BALLS ARE WORN. IF THEY  
ARE WORN OUT, REPLACE THEM.

7. CLEAN OFF OLD GREASE FROM  
ALL PARTS.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OUT STEEL BALLS.
2. REPLACED ALL WORN OUT PARTS.
3. CLEANED GREASE FROM NEW PARTS.

"TURN THE PAGE"

WORD GUIDE

LUBRICATE - TO MAKE SMOOTH OR SLIPPERY

## READ:

8. PUT BACK HOUSING ON FLYWHEEL. TO TIGHTEN HOUSING, USE BRIGGS & STRATTON TOOL #19114 AND TURN IT TO THE RIGHT.

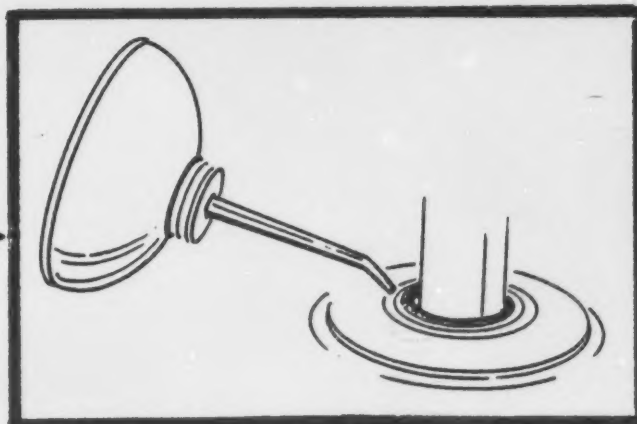
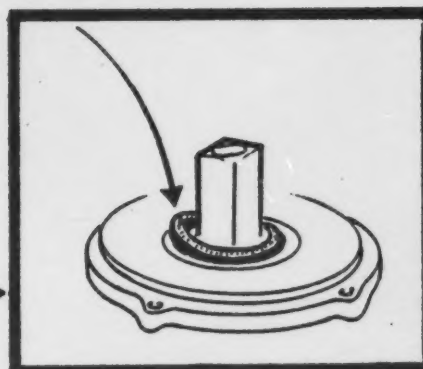
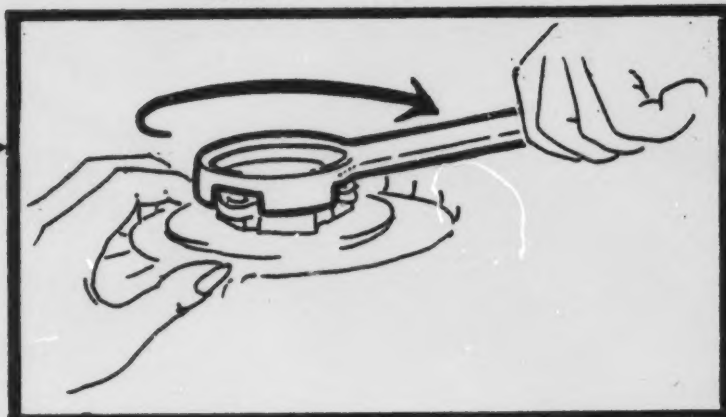
NOTE: WHEN YOU PUT BACK SPRING WASHERS, BE SURE THE 'CUP' SIDE IS TOWARD THE FLYWHEEL.

9. CLEAN STEEL BALLS AND PUT THEM BACK IN PLACE. DO NOT LUBRICATE THE BALLS.

10. CHECK FELT SEAL AND PLUG IN OUTER END OF RATCHET. PUT IN NEW ONES IF THEY ARE DAMAGED.

11. LUBRICATE FELT WITH OIL AND PUT RATCHET ON CRANKSHAFT.

## LOOK:



"TURN THE PAGE"

READ:

12. PUT A LITTLE GREASE ON  
RATCHET AND SHAFT.



LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TIGHTENED HOUSING ON FLYWHEEL.
2. MADE SURE CUP SIDE OF SPRING WASHER IS TOWARD FLYWHEEL.
3. CLEANED AND PUT BACK STEEL BALLS WITHOUT LUBRICATING THEM.
4. CHECKED FELT SEALS AND REPLACED DAMAGED ONES.
5. USED OIL TO LUBRICATE FELT.
6. PUT RATCHET ON CRANKSHAFT.
7. PUT SOME GREASE ON RATCHET AND SHAFT.

13. PUT THE COVER, ROTATING  
SCREEN AND RUBBER SEAL ON THE  
HOUSING. BOLT THEM IN PLACE.



14. PUT BACK BLOWER HOUSING  
ON ENGINE. THE WORD "TOP"  
SHOULD FACE THE ENGINE CYLINDER  
HEAD.

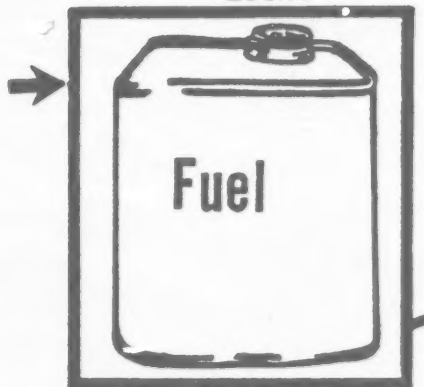


"TURN THE PAGE"

READ:

15. CHECK FUEL AND OIL.

LOOK:

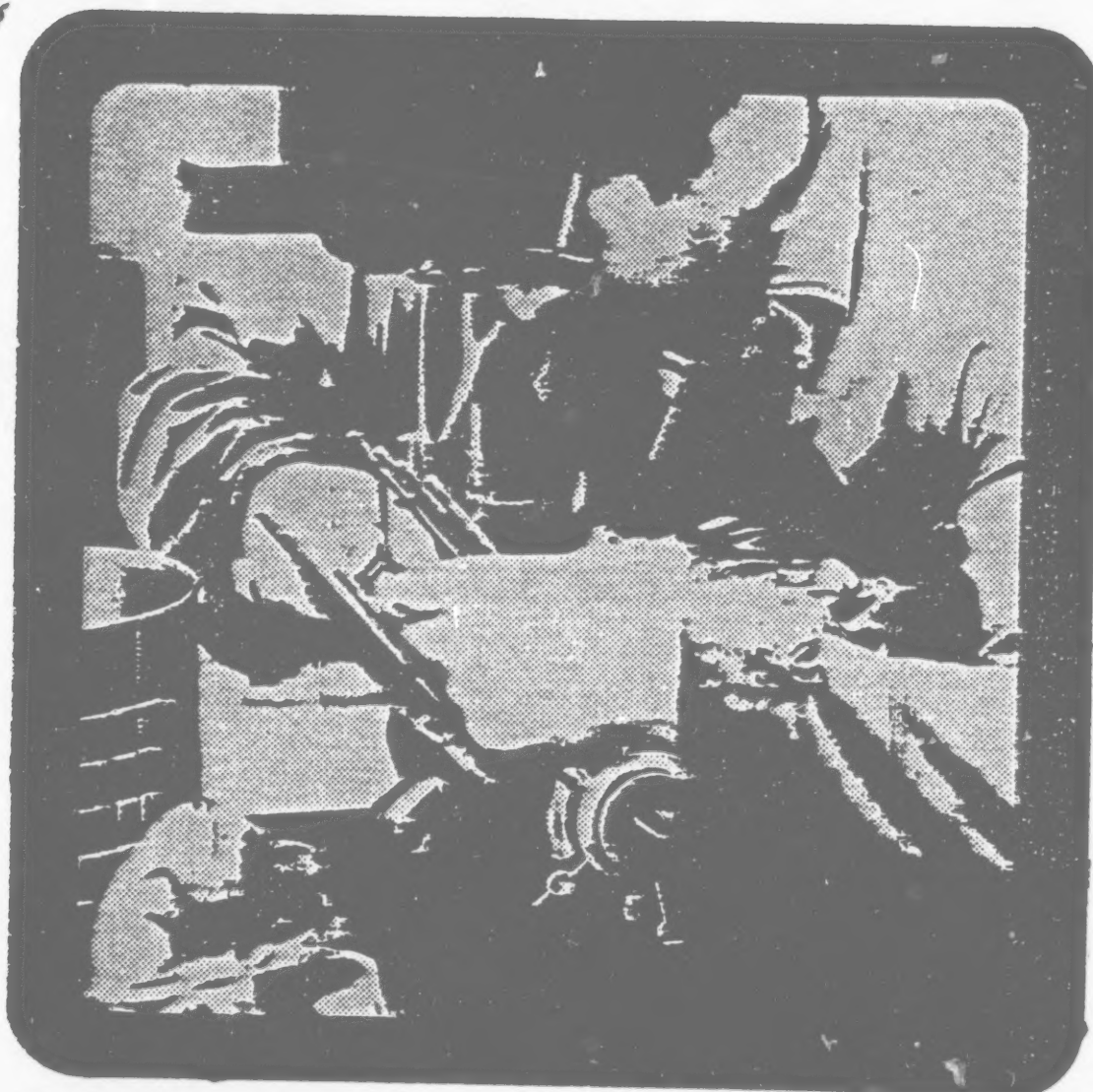


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. BOLTED THE COVER, ROTATING SCREEN AND RUBBER SEAL ONTO THE HOUSING.
2. PUT BACK BLOWER HOUSING ON ENGINE SO THAT THE "TOP" FACES CYLINDER HEAD.
3. CHECKED FUEL AND OIL.

16. HAVE INSTRUCTOR WATCH YOU AS YOU START THE ENGINE.





## small engine repair

unit: STARTERS

capital area career center

module: 7501 03 004 1  
7501 03 004 3 date: 7/77 level: I

skill title: REPLACE STARTER ROPE

developed & written by: HARRY WRIGHT

visuals by: DAVE WEHRWEIN 180

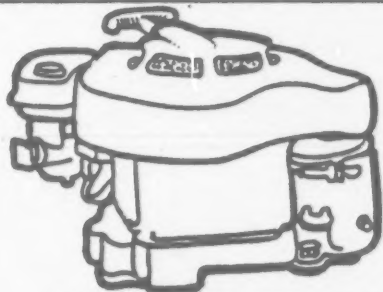
WORD GUIDE

RECOIL STARTER - PULLS STARTER  
ROPE BACK WITHOUT HAND  
WINDING

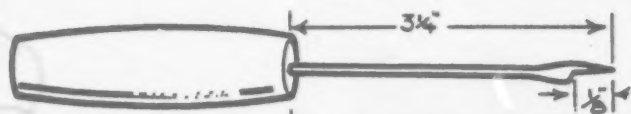
INSERTER TOOL - TOOL USED TO  
PUSH THE STARTER ROPE THROUGH  
THE PULLEY IN THE RECOIL  
STARTER

PERFORMANCE OBJECTIVESYOU ARE GOING TO LEARN:

HOW TO REMOVE AND REPLACE A STARTER ROPE ON A BRIGGS AND  
STRATTON ENGINE WHICH HAS A RECOIL STARTER.

AND IN ORDER TO DO THIS YOU WILL NEED:

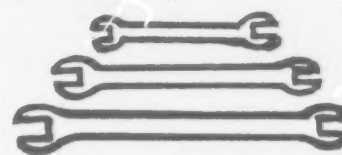
BRIGGS AND STRATTON  
ENGINE WITH A RECOIL  
STARTER



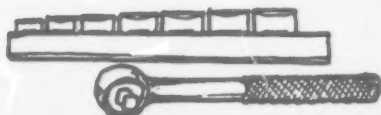
ROPE INSERTER TOOL



NEW ROPE



AN OPEN-END WRENCH SET



A SOCKET SET



A SHARP KNIFE



A BRIGGS & STRATTON MANUAL

"TURN THE PAGE"

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED ALL OF YOUR EQUIPMENT.
2. YOU HAVE REMOVED BLOWER HOUSING.
3. YOU HAVE TAKEN OFF OLD ROPE.
4. YOU HAVE PUT IN NEW ROPE.
5. YOU HAVE REFINISHED HOUSING.
6. YOU HAVE STARTED THE ENGINE.

"TURN THE PAGE"

WORD GUIDE

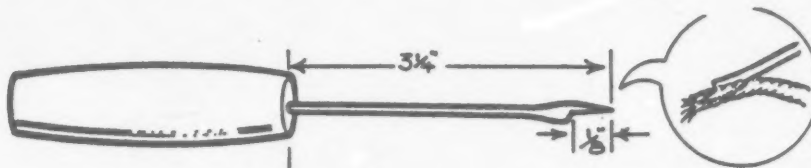
FRAYED - WORN INTO LOOSE PIECES

DIAMETER - THICKNESS OF ROUND  
OBJECTS OR HOLES

PULLEY - A SMALL WHEEL WITH A  
GROOVED RIM WHICH HOLDS A  
ROPE OR CABLE

INFORMATION

WHEN THE STARTER ROPE GETS FRAYED OR BROKEN, IT MUST BE REPLACED.  
WHEN YOU GET THE NEW ROPE, BE SURE IT IS THE RIGHT DIAMETER AND  
LENGTH. A ROPE INSERTER TOOL MAY BE USED TO PUSH THE ROPE THROUGH  
THE PULLEY.



A WIRE CAN ALSO BE USED:



TO CHANGE THE ROPE, THE STARTER PULLEY AND SPRING DO NOT HAVE TO  
BE TAKEN OFF FROM THE HOUSING.

"TURN THE PAGE"

WORD GUIDE

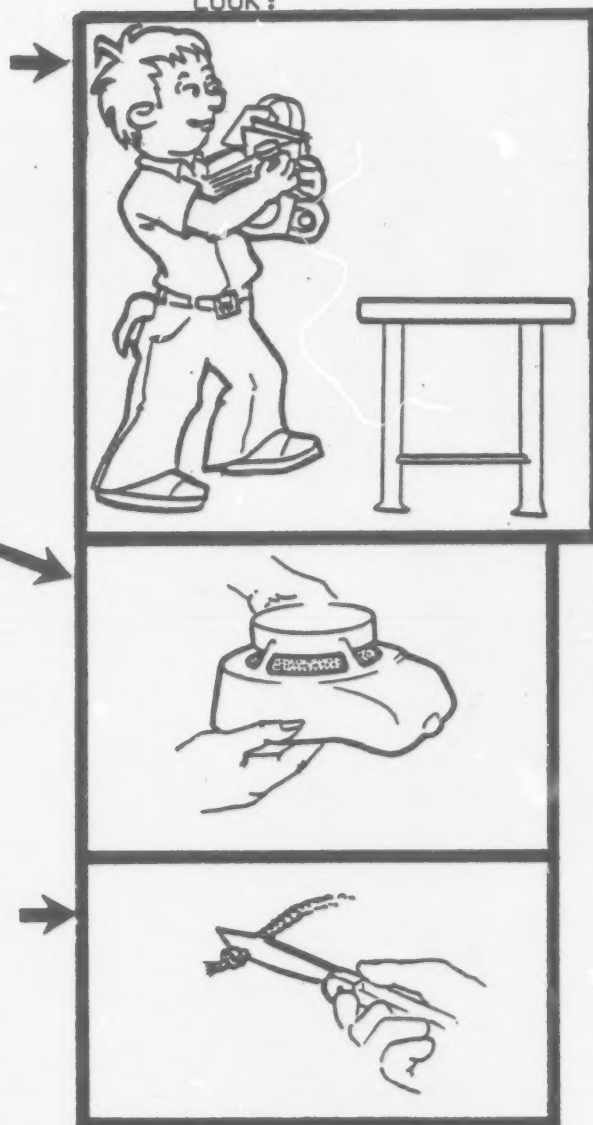
BLOWER HOUSING - COVER OR CONTAINER  
HOLDING THE STARTER ROPE

JOB STEPSREAD:

1. GET ALL EQUIPMENT AND TAKE  
IT TO YOUR WORK AREA.

2. USING YOUR SOCKET SET,  
REMOVE THE BLOWER HOUSING FROM  
THE ENGINE.

3. USING YOUR KNIFE, CUT OFF  
THE KNOT FROM THE PULLEY AND  
TAKE OLD ROPE OUT OF THE  
PULLEY.

LOOK:

"TURN THE PAGE"



WORD GUIDE

HUB - THE CENTER PART OF THE  
STARTER WHEEL

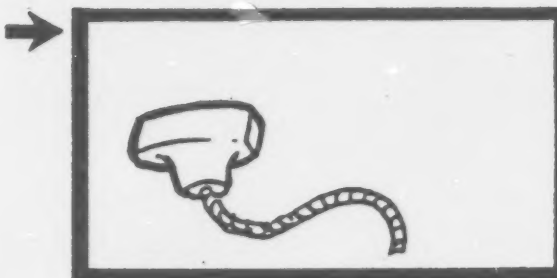
COUNTERCLOCKWISE - TO THE LEFT

WIND - TO TURN MANY TIMES

READ:

4. TIE THE NEW ROPE IN THE  
HANDLE.

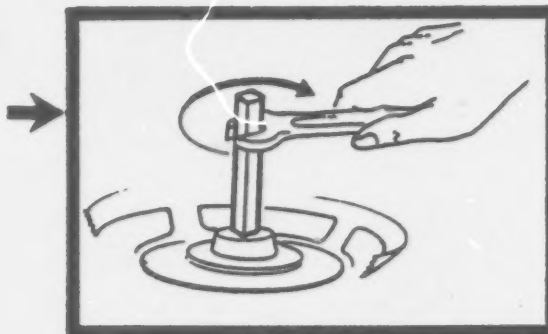
LOOK:



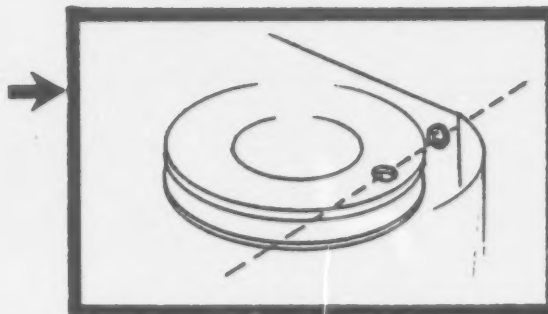
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. CORRECTLY TAKEN OFF THE BLOWER HOUSING.
3. REMOVED OLD ROPE AND REPLACED PROPERLY  
WITH NEW ROPE.

5. PUT A 3/4" PIECE OF METAL  
IN THE PULLEY KNOB AND TURN  
THE HUB.



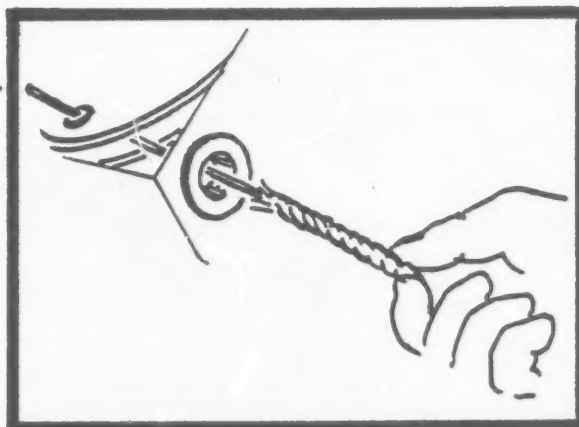
6. TURN THE PULLEY BACK UNTIL  
THE HOLES IN THE HOUSING AND  
PULLEY ARE EVEN (LINED UP)  
WITH EACH OTHER.



"TURN THE PAGE"

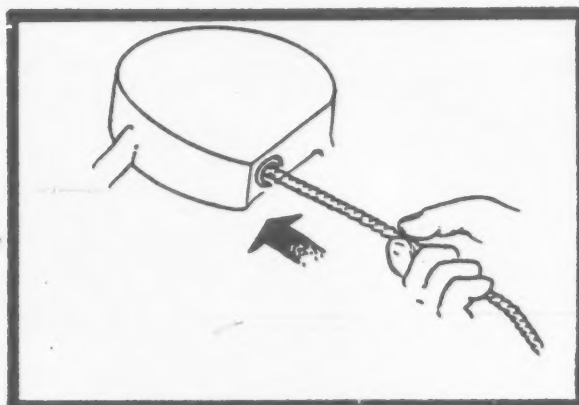
## READ:

7. USING WIRE OR ROPE INSERTER TOOL, FEED THE NEW ROPE INTO THE PULLEY. SEE PICTURE IN JOB STEP # 6.



8. TIE A KNOT IN THE ROPE.

9. LET GO OF THE PULLEY, LETTING THE SPRING WIND THE ROPE INTO THE PULLEY.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT METAL PIECE IN PULLEY KNOB AND TURNED THE HUB.
2. CORRECTLY LINED UP THE HOLES IN HOUSING AND PULLEY.
3. WRAPPED THE ROPE AROUND THE PULLEY.

"TURN THE PAGE"

READ:

LOOK:

10. USING YOUR SOCKET SET, PUT THE BLOWER HOUSING BACK ON THE ENGINE.

11. CHECK THE FUEL AND OIL IN THE ENGINE. →



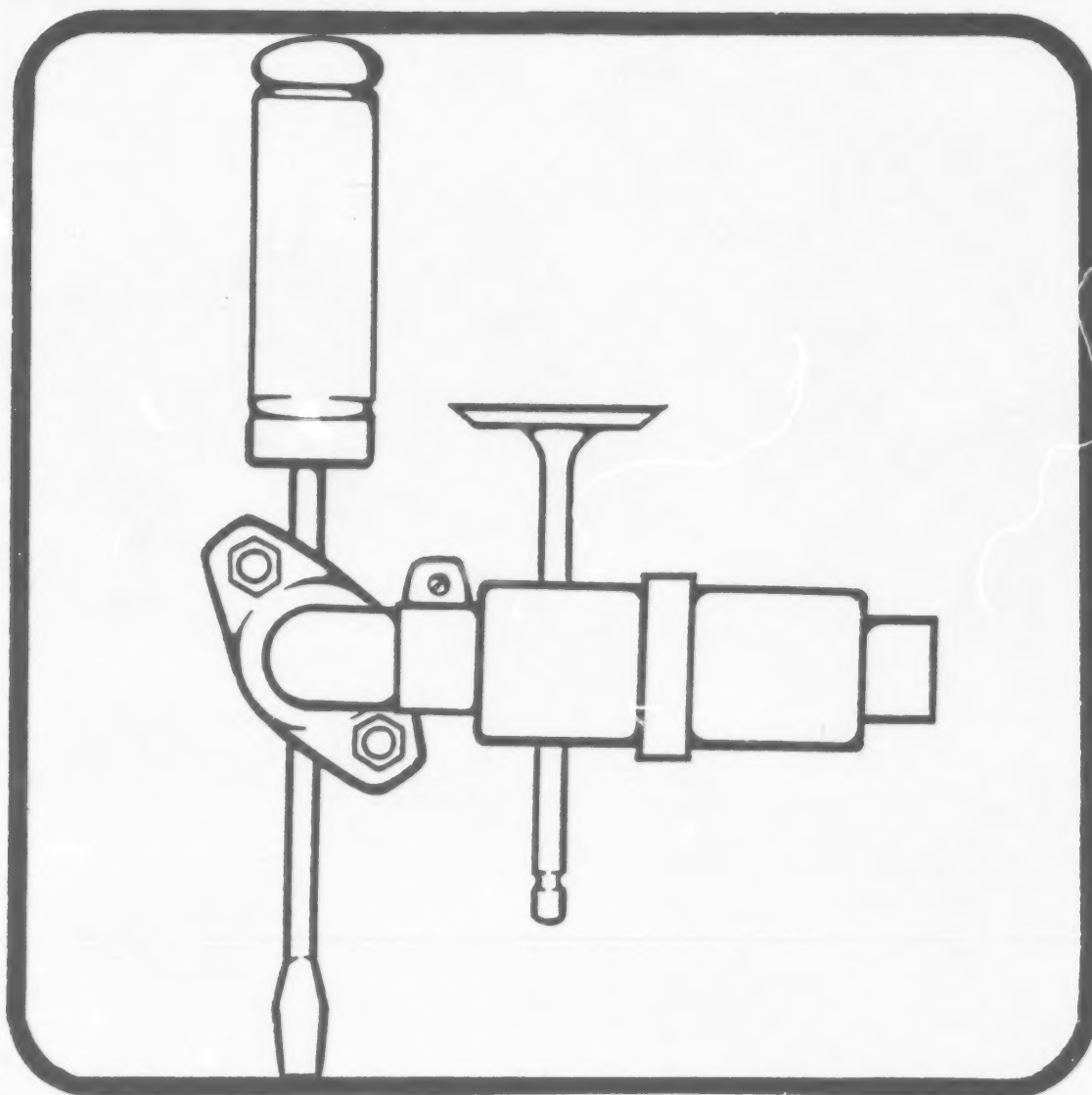
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT ON THE BLOWER HOUSING TIGHT ENOUGH.
2. BROUGHT THE FUEL AND OIL LEVELS TO THE CORRECT LEVEL.

12. START THE ENGINE TO SEE IF THE STARTER WORKS CORRECTLY. IF THE ENGINE WILL NOT START, SEE YOUR INSTRUCTOR. →



13. WHEN THE ENGINE STARTS AND THE ROPE GOES BACK INTO THE PULLEY, YOU KNOW YOU HAVE DONE A GOOD JOB.



## small engine repair

unit: STARTERS

capital area career center

module: 7501 03 005 1  
7501 03 005 3 date: OCTOBER 1977 level: I

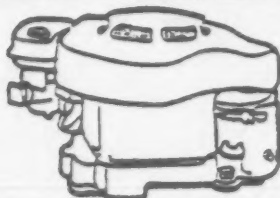
skill title: WIND-UP STARTER

developed & written by: A. STEINBERG

visuals by: DAVE WEHRWEIN

GUIDELINES - RULESSERVICE - WORK ON, FIXPERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO SERVICE A BRIGGS & STRATTON WIND-UP STARTER.

AND IN ORDER TO DO THIS YOU WILL NEED:

BRIGGS & STRATTON ENGINE  
WITH WIND-UP STARTER



SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE ALL YOUR EQUIPMENT.
2. YOU HAVE SERVICED THE WIND-UP STARTER TO THE MANUAL'S GUIDELINES.

"TURN THE PAGE"



### INFORMATION

THERE ARE TWO KINDS OF WIND-UP STARTERS. THE EARLY MODEL HAS A CONTROL KNOB AND THE LATE MODEL HAS A CONTROL LEVER. THIS MOD WILL TEACH YOU TO SERVICE THE LATE MODEL. IF YOU HAVE AN EARLY MODEL, REFER TO SMALL ENGINE SERVICE MANUAL, PAGE 56.

BEFORE YOU WORK ON THE ENGINE, BE SURE THE SPRING IS NOT WOUND. TEST IT BY TURNING THE CRANK TO THE LEFT. IF THE SPRING IS WOUND, UNWIND BY MOVING THE CONTROL LEVER TO "START". FOR MORE INFORMATION, READ BRIGGS & STRATTON SERVICE MANUAL, SECTION 7, PAGES 3-4. LOOK AT THE PICTURE BELOW WHEN WORKING ON THE STARTER.

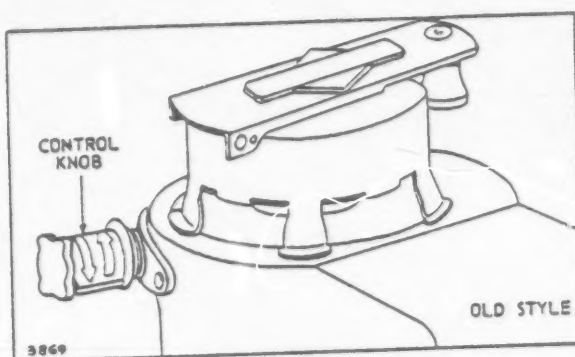


Fig. 15 - Old Style Starter Assembly

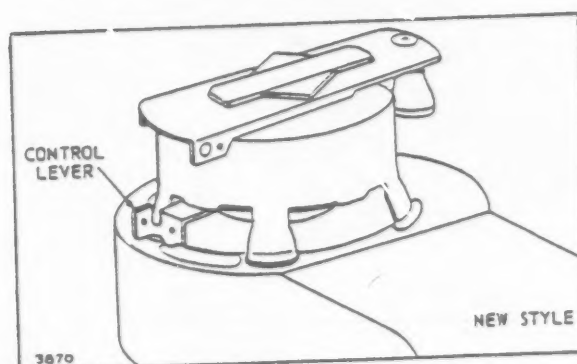


Fig. 16 - New Style Starter Assembly

"TURN THE PAGE"

WORD GUIDEREMOVE - TAKE OFFJOB STEPS

READ:

1. TAKE ALL EQUIPMENT TO YOUR  
WORK AREA.

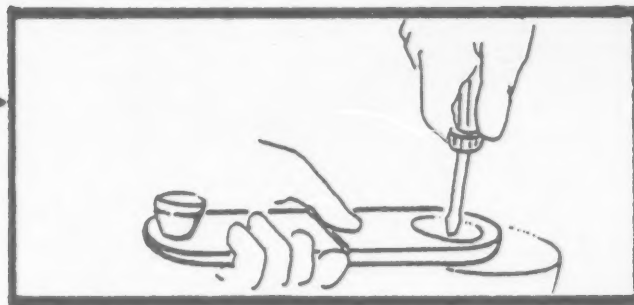


LOOK:

2. MOVE THE CONTROL LEVER TO  
"START".



3. HOLD THE CRANK AND REMOVE  
THE SCREW. WEAR YOUR SAFETY  
GLASSES.

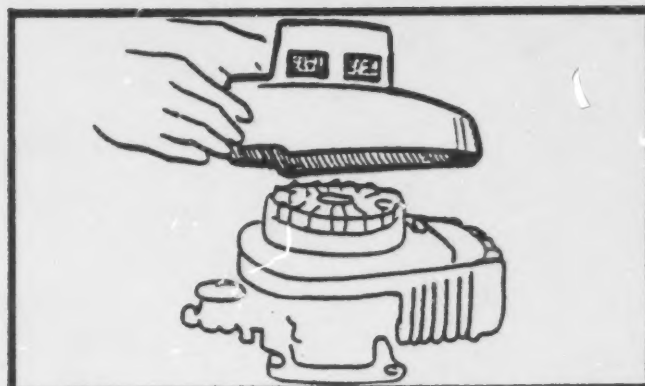


"TURN THE PAGE"

JOB STEPS

READ:

4. REMOVE THE BLOWER HOUSING FROM THE ENGINE.



LOOK:

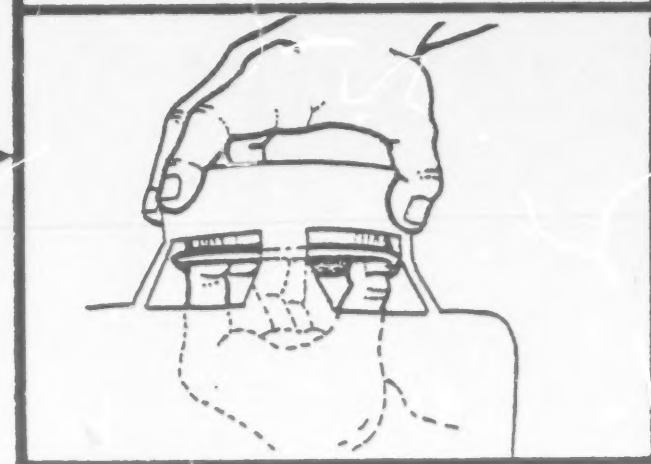
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. MOVED THE CONTROL LEVER TO "START".
3. HELD THE CRANK AND REMOVED THE SCREW.
4. REMOVED THE BLOWER HOUSING.
5. PUT ON YOUR SAFETY GLASSES.

5. TURN OVER THE BLOWER HOUSING AND BEND OUT THE TANGS.



6. LIFT THE CUP, SPRING AND CONTROL LEVER ASSEMBLY FROM THE BLOWER HOUSING.



CAUTION: SEE INSTRUCTOR BEFORE REMOVING THIS ASSEMBLY.

"TURN THE PAGE"

WORD GUIDEDAMAGE - WEAR, CRACKS, ETC.JOB STEPSREAD:

7. LOOK CLOSELY AT THE SPRING AND HOUSING ASSEMBLY FOR BREAKS OR DAMAGE.

8. LOOK CLOSELY AT THE RATCHET GEAR FOR BREAKS AND DAMAGE.

9. CHECK TO SEE THAT THE CONTROL LEVER IS FREE TO MOVE.

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TURNED OVER THE BLOWER HOUSING AND BENT THE TANGS.
2. LIFTED THE CUP, SPRING AND CONTROL LEVER ASSEMBLY FROM THE BLOWER HOUSING.
3. LOOKED CLOSELY AT: THE SPRING, HOUSING ASSEMBLY, RATCHET GEAR FOR BREAKS AND DAMAGE.
4. CHECKED TO SEE THAT THE CONTROL LEVER IS FREE TO MOVE.

"TURN THE PAGE"

WORD GUIDEREPLACE - CHANGE OR PUT BACKJOB STEPS

READ:

LOOK:

10. GREASE THE MATING SURFACES OF THE SPRING CUP AND BLOWER HOUSING.



11. PUT THE SPRING WASHER INTO THE HOUSING. PUT THE CUP, SPRING, AND RELEASE ASSEMBLY IN THE HOUSING AND BEND THE TANGS DOWN.



12. REPLACE THE CRANK AND SCREW.



13. PUT THE BLOWER HOUSING BACK ONTO THE ENGINE.

"TURN THE PAGE"



JOB STEPS

READ:

14. CHECK THE FUEL AND OIL.



LOOK:

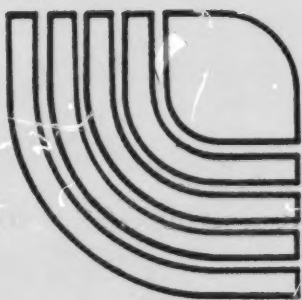
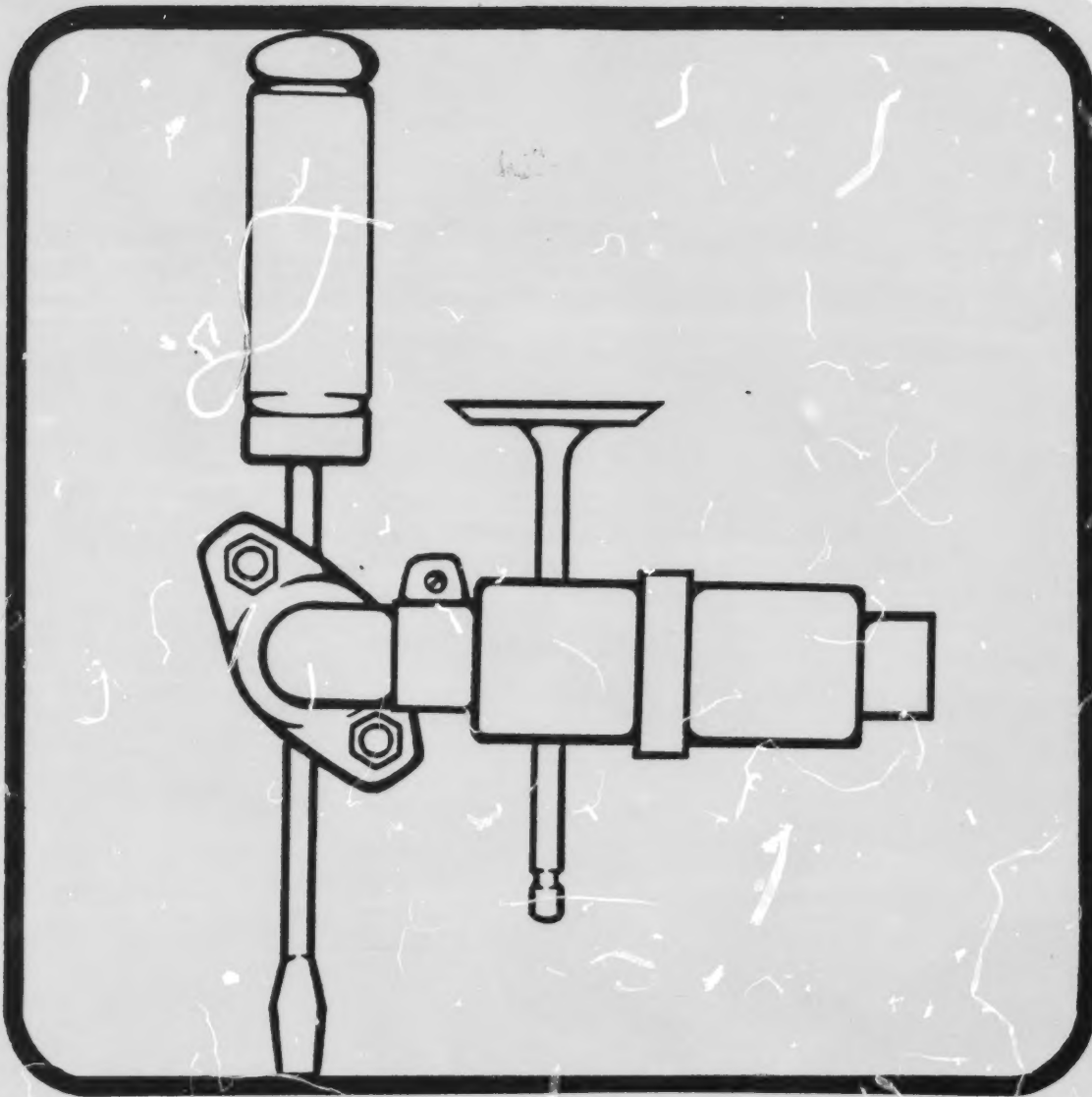


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. GREASED THE MATING SURFACES OF THE SPRING CUP AND BLOWER HOUSING.
2. PUT THE SPRING WASHER, CUP, SPRING AND RELEASE INTO THE HOUSING AND BENT THE TANGS DOWN.
3. REPLACED THE CRANK AND SCREW.
4. PUT THE BLOWER HOUSING BACK ONTO THE ENGINE.
5. CHECKED THE FUEL AND OIL.

15. HAVE YOUR INSTRUCTOR THERE AS YOU START THE ENGINE TO SEE IF IT WORKS RIGHT.





## small engine repair

Unit: STARTERS

capital area career center

module: 7501 03 006 1 7501 03 006 3 date: AUGUST 1977 level: I

skill title: TECUMSEH RATCHET STARTER REMOVAL

developed & written by: DWIGHT SMITH AND JIM PITTS

visuals by: DAVE WEHRWEIN

WORD GUIDEREMOVE - TAKE OFF.REPLACE - CHANGE OR PUT BACK.PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REMOVE AND REPLACE THE STARTER MAIN SPRING HOUSING FROM A TECUMSEH ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:

TECUMSEH ENGINE WITH RATCHET  
OR IMPULSE STARTER



HAND TOOLS



SMALL ENGINE SERVICE MANUAL  
FIG. TE13, P. 311.

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE REMOVED AND REPLACED THE STARTER MAIN SPRING HOUSING FROM A TECUMSEH ENGINE.
2. THE STARTER TURNS THE ENGINE OVER WELL.

"TURN THE PAGE"

JOB STEPS

READ:

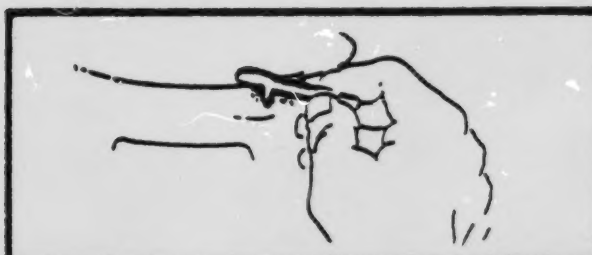
1. TAKE ALL EQUIPMENT TO YOUR WORK AREA.



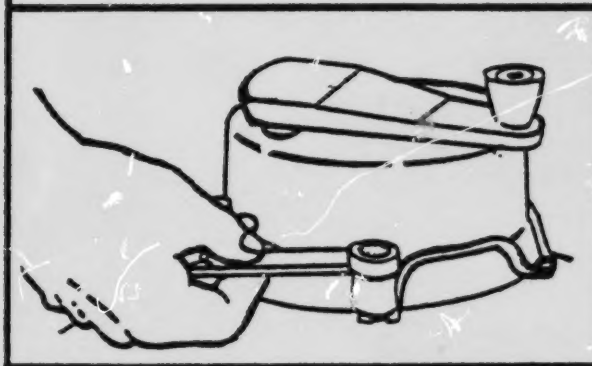
LOOK:



2. MOVE THE STARTER RELEASE LEVER TO "RELEASE". THIS LETS THE SPRING LOOSE.



3. USE THE RIGHT SIZE SOCKET WRENCH AND RATCHET TO REMOVE THE BOLTS FROM THE STARTER HOUSING.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL THE EQUIPMENT YOU NEED.
2. LET SPRING LOOSE.
3. TAKEN THE BOLTS OUT OF THE STARTER HOUSING.

"TURN THE PAGE"



JOB STEPS

READ:

4. LIFT THE STARTER HOUSING OFF THE ENGINE.

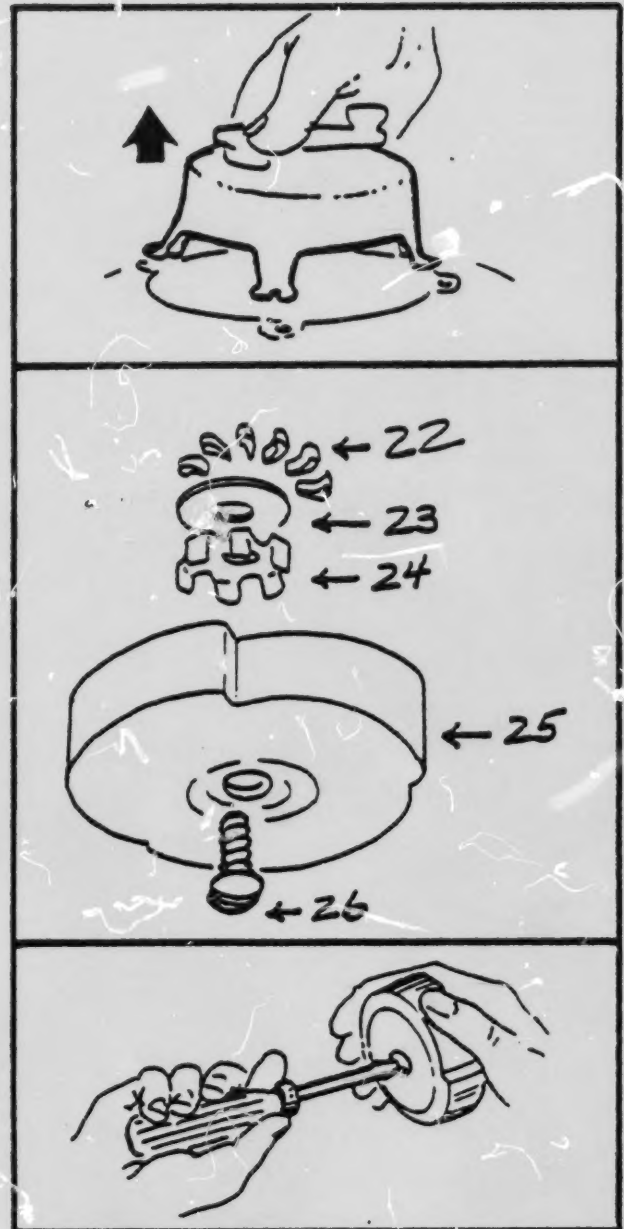
5. LOOK CAREFULLY AT THE STARTER. FIND THESE PARTS:

- A. SCREW (26)
- NOTE: THIS SCREW HAS LEFT HAND THREADS.
- B. RETAINER SCREEN (25)
- C. BRAKE (24)
- D. BRAKE WASHER (23)
- E. SIX STARTER DOGS (22)

LOOK AT HOW THESE PARTS ARE PUT IN THE STARTER.

6. REMOVE THE SCREW (26) AND OTHER PARTS LISTED IN JOB STEP 5. BE SURE YOU KNOW HOW TO PUT THE STARTER DOGS BACK IN.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

- 1. TAKEN OFF THE STARTER HOUSING.
- 2. REMOVED THE PARTS LISTED IN JOB STEP 5.



# WORD GUIDE

ASSEMBLY - A UNIT MADE UP OF SMALLER PARTS.

## JOB STEPS

READ:

7. TAKE OFF THE ASSEMBLY WHICH HAS THESE PARTS:

- A. HUB (21)
- B. WASHER (20)
- C. SPRING AND HOUSING (12)
- D. SPRING COVER (18)
- E. RELEASE GEAR (17)
- F. RETAINING RING (19)

NOTE: TAKE THE ASSEMBLY OFF AS ONE UNIT AND PUT IT ON THE WORK BENCH.

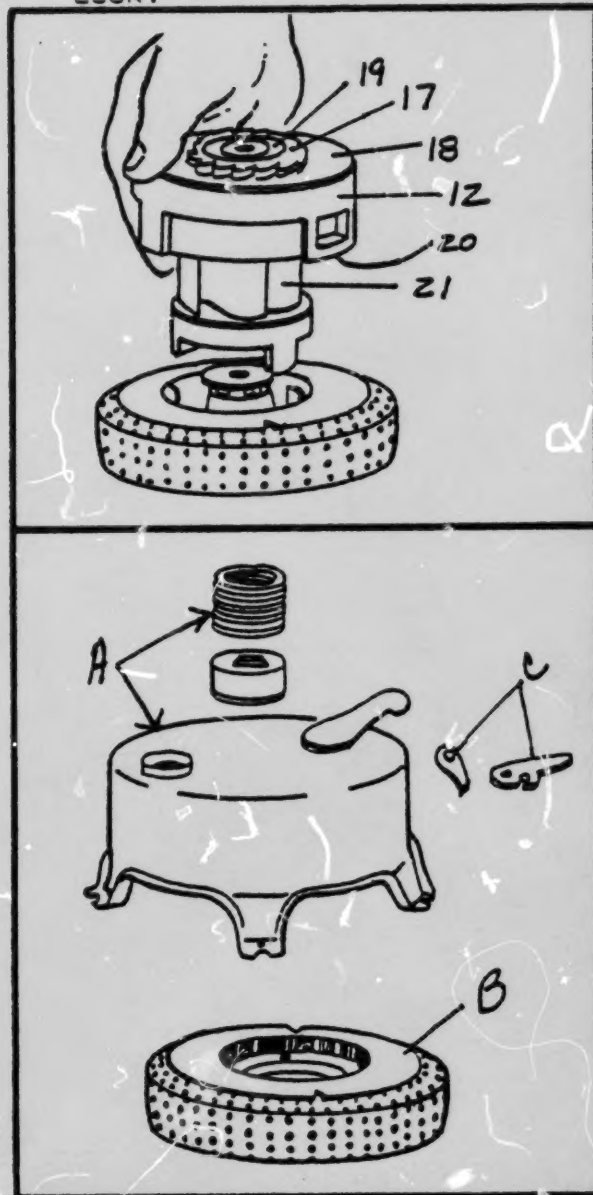
8. TAKE OFF THE RETAINING RING. THEN, REMOVE THE REST OF THE PARTS. DO NOT REMOVE THE MAIN SPRING FROM THE HOUSING! YOU WOULD NOT BE ABLE TO GET IT BACK IN AGAIN.

9. LOOK CAREFULLY AT THESE PARTS:

- A. MAIN SPRING AND HOUSING
- B. HUB
- C. DOGS

LOOK FOR WORN OUT OR BROKEN PARTS. ASK YOUR INSTRUCTOR FOR NEW PARTS, IF NEEDED.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE ASSEMBLY FROM JOB STEP 7.
2. TAKEN APART THE ASSEMBLY.
3. CHECKED FOR BROKEN OR WORN OUT PARTS.

"TURN THE PAGE"

JOB STEPS

READ:

10. REPLACE THE STARTER.  
FOLLOW JOB STEPS 3 TO 8 IN  
REVERSE ORDER, THAT IS, FROM  
8 TO 3.

NOTE:

CHECK THE SERVICE MANUAL AND  
ASK YOUR INSTRUCTOR IF YOU  
HAVE ANY QUESTIONS. BE SURE  
TO REPLACE THE STARTER RIGHT.

11. CHECK THE OIL AND FUEL IN  
THE ENGINE. ADD OIL OR GAS,  
IF NEEDED.

12. START THE ENGINE. CHECK  
THAT THE STARTER WORKS RIGHT.

13. SHUT OFF THE ENGINE.

LOOK:



"TURN THE PAGE"

JOB STEPS

READ:

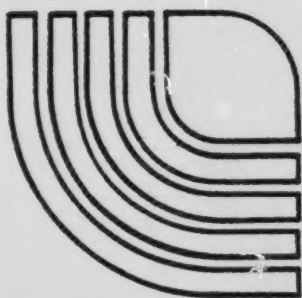
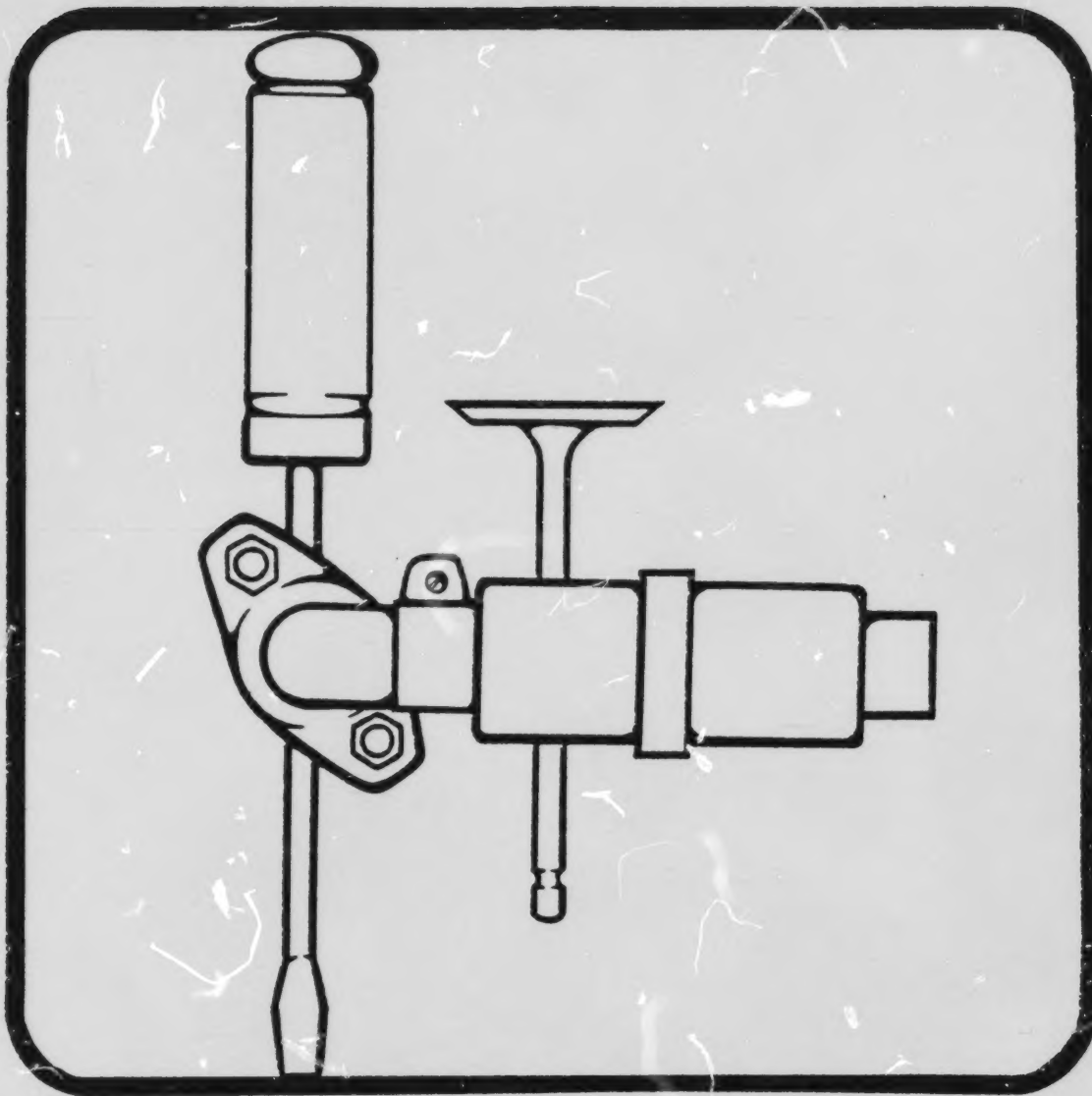
14. PUT AWAY ALL THE TOOLS AND EQUIPMENT IN THE RIGHT PLACES AND CLEAN UP THE WORK AREA.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REPLACED THE STARTER RIGHT.
2. CHECKED THE OIL AND GAS LEVELS.
3. REMOVED AND REPLACED THE STARTER SO THAT IT WORKS WELL.
4. PUT AWAY ALL THE EQUIPMENT AND CLEANED UP THE WORK AREA.



## small engine repair

unit: STARTERS

capital area career center

module: 7501 03 007 1 7501 03 007 3 date: JANUARY 1978 level: I

skill title: TECUMSEH WIND-UP SPRING REMOVAL (SURE START)

developed & written by: JACK HELDER

visuals by: STEVE BRAMER

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REMOVE THE STARTER MAIN SPRING AND HOUSING FROM A  
"SURE START" TECUMSEH ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:

TECUMSEH ENGINE WITH A "SURE START" STARTER

HAND TOOLS

TECUMSEH ENGINE SERVICE MANUAL

SLIDE TAPE ON TECUMSEH WIND-UP SPRING REMOVAL

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED ALL EQUIPMENT.
2. YOU HAVE WATCHED THE SLIDE TAPE.
3. YOU HAVE REMOVED AND REPLACED THE STARTER MAIN SPRING  
AND HOUSING FROM A TECUMSEH "SURE START" STARTER  
ACCORDING TO SERVICE MANUAL SPECIFICATIONS.

"TURN THE PAGE"



JOB STEPS

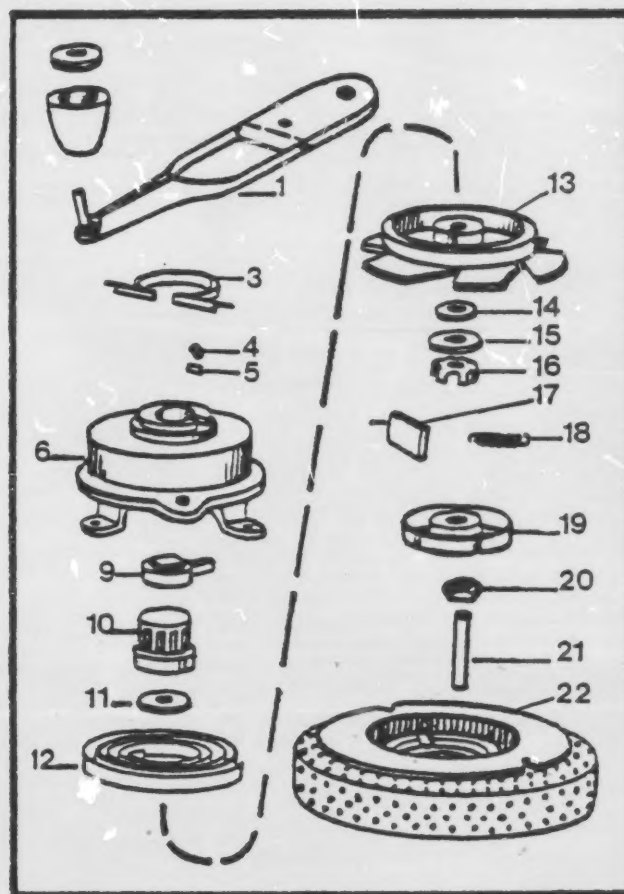
READ:

1. LOOK AT THE DRAWING OF THE "SURE START" REMOTE RELEASE IMPULSE STARTER. LEARN THE PARTS.

2. NOW TRY TO NAME THE PARTS ON THIS DRAWING. TRY TO NAME THE PARTS WITHOUT LOOKING AT THE ANSWERS BELOW.

- |                    |                    |
|--------------------|--------------------|
| 1. CRANKING HANDLE | 12. POWER SPRING   |
| 2. WIND DOG        | 13. SPRING HOUSING |
| 3. BRAKE BAND      | 14. SHIM           |
| 4. LOCK DOG SPRING | 15. THRUST WASHER  |
| 5. LOCK DOG        | 16. BRAKE          |
| 6. HOUSING         | 17. STARTER DOG    |
| 7. RELEASE ARM     | 18. SPRING         |
| 8. WAVE WASHER     | 19. RETAINER       |
| 9. RELEASE ARM     | 20. SHOULDER NUT   |
| 10. HUB            | 21. CENTERING PIN  |
| 11. SPACER WASHER  | 22. HUB & SCREEN   |

LOOK:



CHECK: SHOW YOUR INSTRUCTOR THAT YOU KNOW THE FOLLOWING PARTS:

1. CRANKING HANDLE
2. HOUSING
3. HUB
4. SPRING HOUSING
5. POWER SPRING
6. SPACER WASHER
7. RETAINER
8. SHOULDER NUT
9. CENTERING PIN
10. STARTER DOGS

READ:

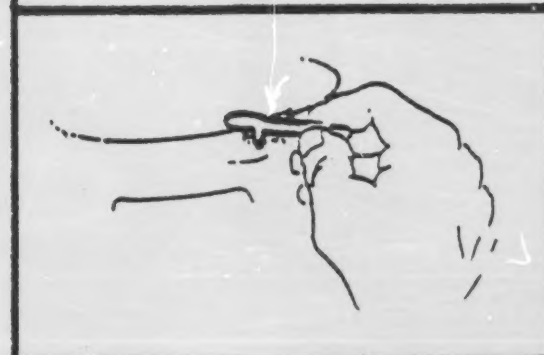
JOB STEPS

LOOK:

3. TAKE ALL YOUR EQUIPMENT  
TO THE WORK AREA.



4. MOVE THE RELEASE LEVER  
TO THE "RELEASE" POSITION  
SO TENSION IS OFF THE MAIN  
SPRING.



5. TAKE BOLTS OUT OF  
HOUSING AND LIFT OFF THE  
STARTER.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

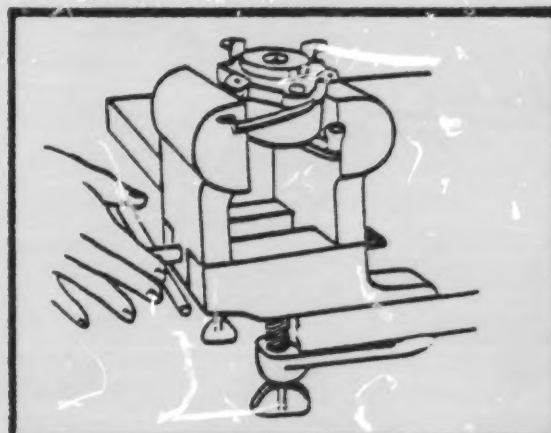
1. TAKEN TENSION OFF MAIN SPRING.
2. REMOVED STARTER HOUSING FROM THE ENGINE  
AND PUT IT IN A VICE.

JOB STEPS

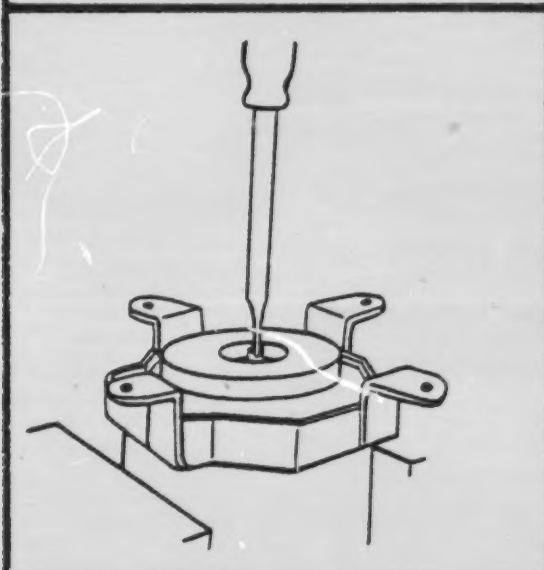
READ:

LOOK:

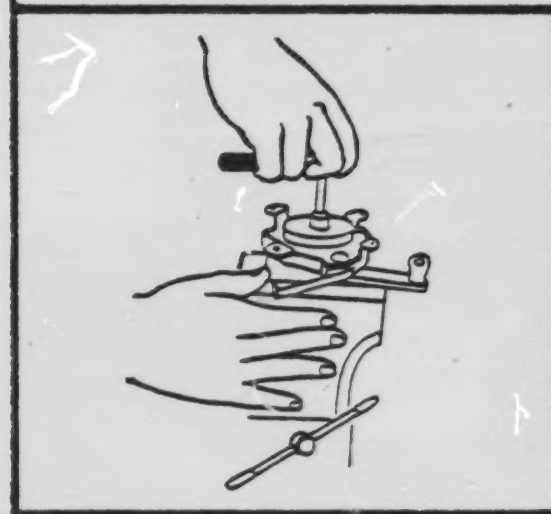
6. PUT THE HOUSING IN A VICE WITH THE CRANKING HANDLE DOWN.



7. REMOVE THE CENTERING PIN (21) WITH A SCREWDRIVER. IT HAS LEFT HAND THREADS.



8. REMOVE THE SHOULDER NUT (20) WITH A WRENCH.



"TURN THE PAGE"

JOB STEPS

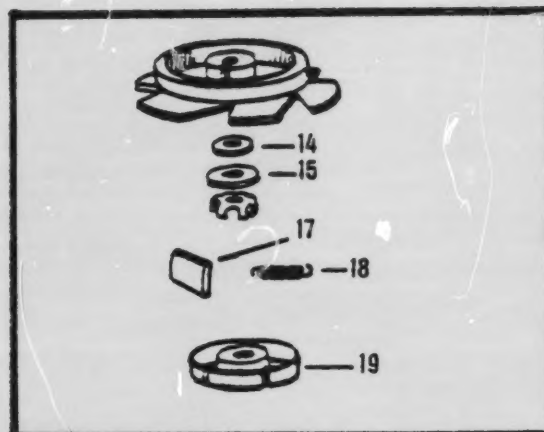
READ:

LOOK:

9. NOW TAKE OFF THESE PARTS:

- A. RETAINER (19)
- B. SPRING (18)
- C. STARTER DOGS (17)
- D. THRUST WASHER (15)
- E. SHIM (14)

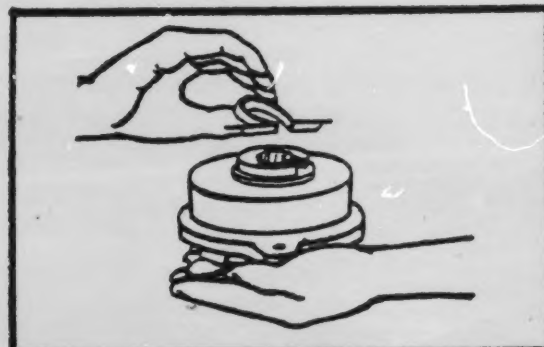
NOTE: BE SURE TO KEEP ALL PARTS IN ONE PLACE.



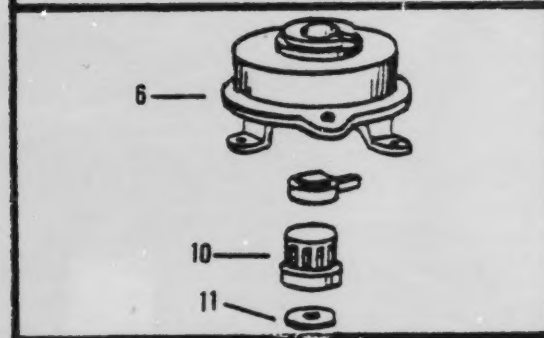
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

- 1. REMOVED CENTERING PIN AND SHOULDER NUT.
- 2. REMOVED ALL THE PARTS LISTED IN STEP 9.

10. REMOVE STARTER FROM THE VICE AND TAKE OUT THE CRANKING HANDLE (1), WIND DOG (2) AND BRAKE BAND (3).



11. TAKE OFF THE HOUSING (6), HUB (10) AND SPACER WASHER (11).



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

- 1. TAKEN OFF ALL THE PARTS IN STEPS 10 AND 11.
- 2. PUT ALL THE PARTS IN ONE PLACE SO YOU WILL NOT LOSE THEM.

"TURN THE PAGE"





JOB STEPS

READ:

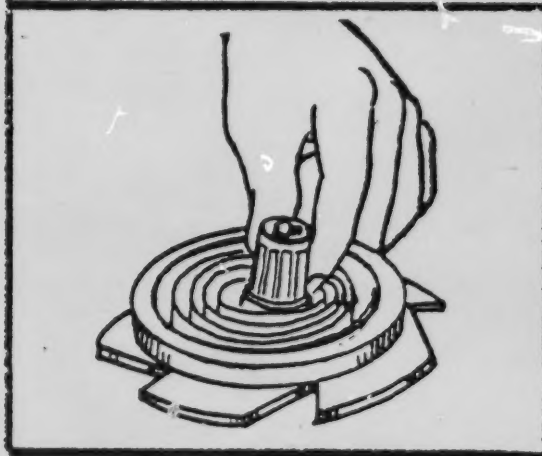
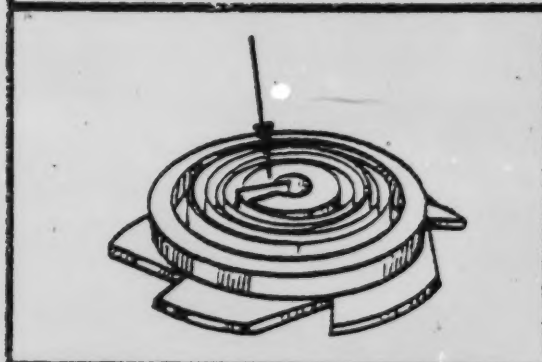
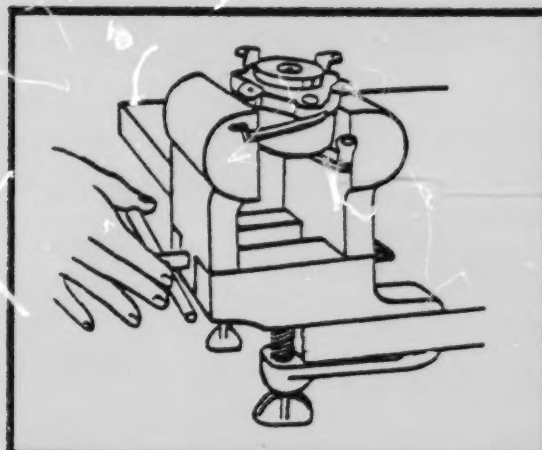
LOOK:

14. REPLACE ANY WORN OR  
BROKEN PARTS.

15. REPLACE SPRING IN  
HOUSING BY FIRST CLAMPING  
THE HOUSING IN A VICE.

16. THEN PUT THE SPRING  
END INTO THE NOTCH IN THE  
HOUSING.

17. PUT THE HUB INTO THE  
CENTER OF THE SPRING.



"TURN THE PAGE"

JOB STEPS

READ:

18. PLACE THE CRANKING  
HANDLE INTO THE HUB.

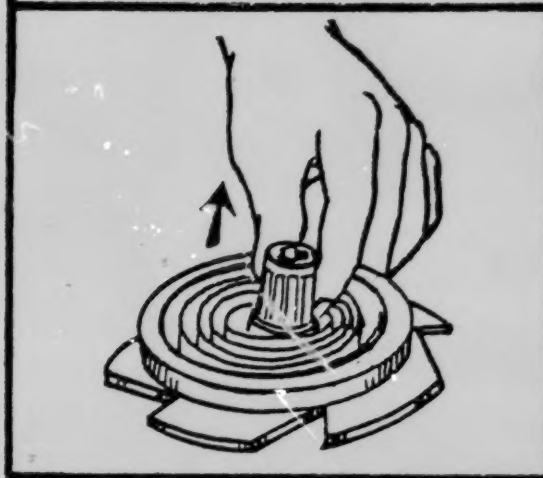
LOOK:



19. PRESS DOWN AND TURN  
HANDLE TO TIGHTEN SPRING  
UNTIL IT FITS BACK INTO  
THE HOUSING.



20. REMOVE THE HANDLE AND  
HUB.



CHECK: SHOW YOUR INSTRUCTOR THAT YOU HAVE PUT THE  
SPRING BACK INTO THE HOUSING.

"TURN THE PAGE"

JOB STEPS

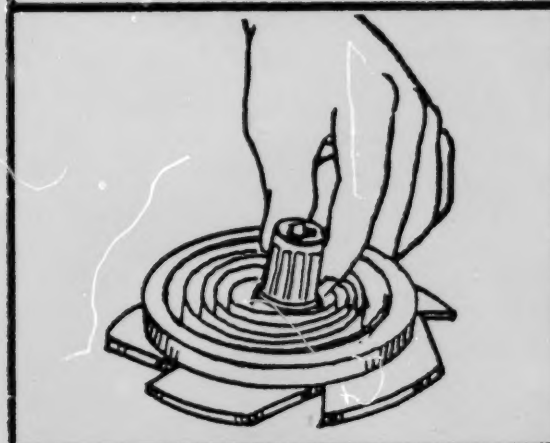
READ:

LOOK:

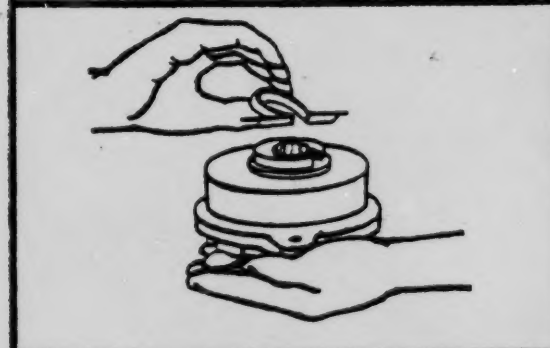
21. PUT THE SPACER WASHER (11)  
BACK IN THE CENTER OF THE  
SPRING.



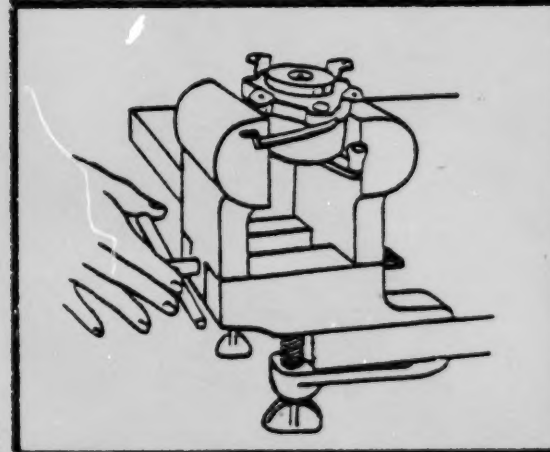
22. PUT IN THE HUB.



23. WITH THE STARTER OUT OF  
THE VICE, REPLACE THE BRAKE  
BAND (3), WIND DOG (2) AND  
CRANKING HANDLE.



24. PUT THE STARTER BACK  
INTO THE VICE WITH THE  
HANDLE DOWN.



JOB STEPS

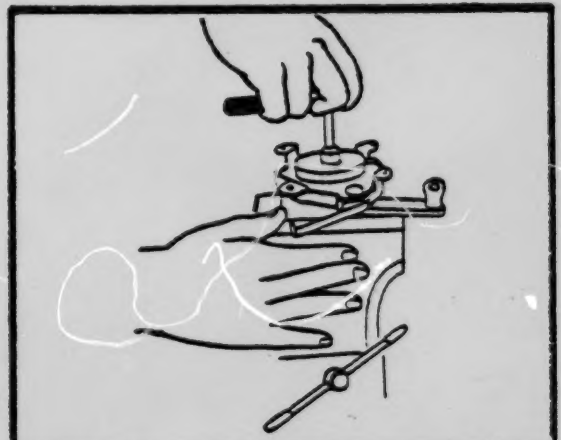
READ:

LOOK:

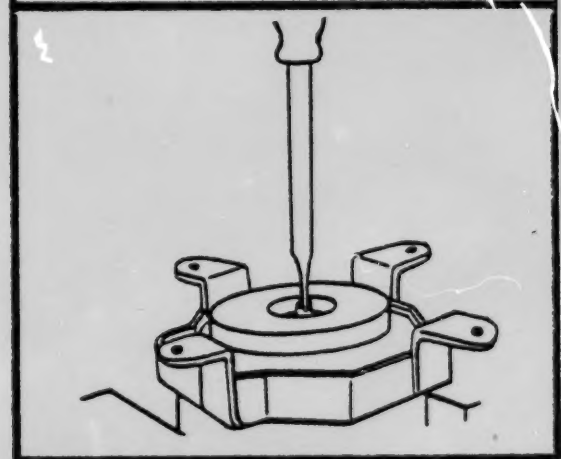
25. PUT ALL PARTS BACK ON IN REVERSE ORDER THAT YOU TOOK THEM OFF IN STEP 9. REMEMBER THE SLIDE TAPE.

CHECK: HAVE YOUR INSTRUCTOR CHECK THAT ALL THE PARTS HAVE BEEN PUT BACK ON IN THE RIGHT WAY.

26. REPLACE THE SHOULDER NUT. BE SURE THE SHOULDER IS DOWN.



27. REPLACE THE CENTERING PIN. REMEMBER: IT HAS LEFT HAND THREADS.



CHECK: SHOW YOUR INSTRUCTOR THAT YOU HAVE PUT THE STARTER BACK TOGETHER.

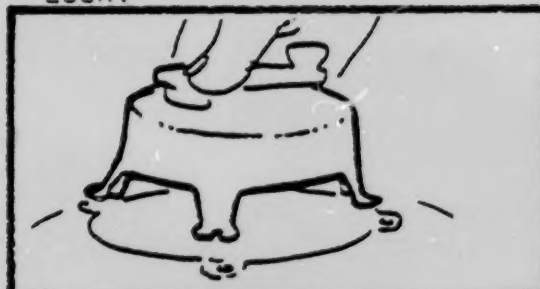
"TURN THE PAGE"

JOB STEPS

READ:

28. PUT THE STARTER BACK  
ON THE ENGINE.

LOOK:



29. CHECK FUEL AND OIL IN  
THE ENGINE.



30. START THE ENGINE.



CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK.

"TURN THE PAGE"



JOB STEPS

READ:

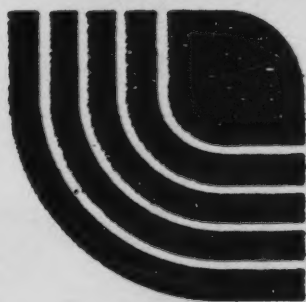
31. CLEAN UP THE ENGINE  
FOR THE CUSTOMER.

LOOK:



32. CLEAN UP YOUR WORK  
AREA.





## small engine repair

unit: FUEL TANKS AND FUEL FILTERS

capital area career center

module: 7501 04 001 1 date: 4/77 level: 1  
7501 04 001 3

skill title: REMOVAL, CLEANING, & REPLACEMENT OF FUEL TANKS AND  
FUEL FILTERS

developed & written by: ANITA FLAGG

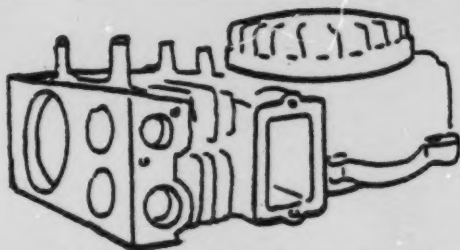
visuals by: DAVE WEHRWEIN

WORD GUIDE

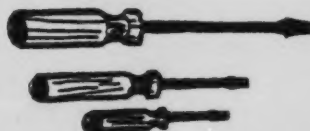
GUNK - FILTHY, STICKY OR GREASY  
MATTER.

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REMOVE, CLEAN AND REPLACE FUEL TANKS AND FUEL FILTERS.

AND IN ORDER TO DO THIS YOU WILL NEED:

A 2 OR 4 CYCLE ENGINE



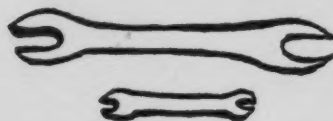
A SCREWDRIIVER SET



DRAIN PAN



A SOCKET SET



AN OPEN-END WRENCH SET



A FLASHLIGHT

WE WILL KNOW YOU CAN DO IT WHEN:

YOU HAVE GATHERED ALL YOUR EQUIPMENT.

YOU HAVE REMOVED BOTH THE TANK AND FILTER, CLEANED THE DIRT,  
WATER, RUST, GUM AND GUNK AND HAVE REPLACED THEM SECURELY IN  
THEIR PROPER POSITIONS.

"TURN THE PAGE"

WORD GUIDEIGNITED - SET ON FIRE.DISCONNECT - TO TAKE APART, OR TO TAKE OFF.JOB STEPS

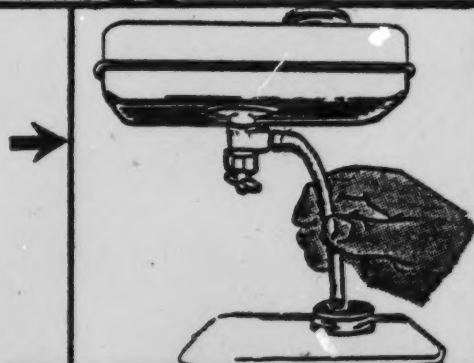
READ:

LOOK:

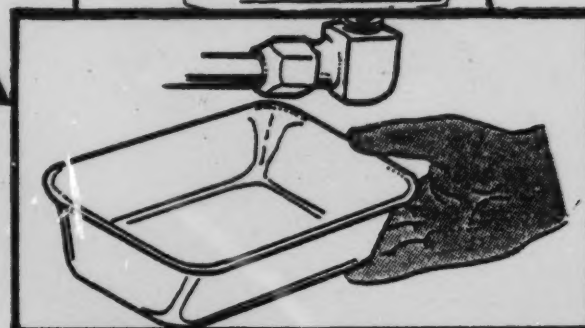
1. GET ALL EQUIPMENT AND TAKE IT TO YOUR WORK AREA. BE SURE YOU WEAR SAFETY GLASSES



2. DRAIN FUEL IN THE TANK INTO A CLOSEABLE CONTAINER. ON SOME ENGINES YOU WILL LOOSEN THE DRAIN PLUG. ON OTHERS YOU DISCONNECT THE FUEL LINE.



3. AFTER FUEL IS DRAINED, PUT A DRAIN PAN UNDER THE FUEL LINE CONNECTOR TO CATCH ANY FUEL DRIPS.

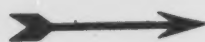


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. DRAINED FUEL TANK INTO A CLOSEABLE CONTAINER.
3. DISCONNECTED FUEL LINE.
4. PLACED DRAIN PAN UNDER DISCONNECTED FUEL LINE.

"TURN THE PAGE"



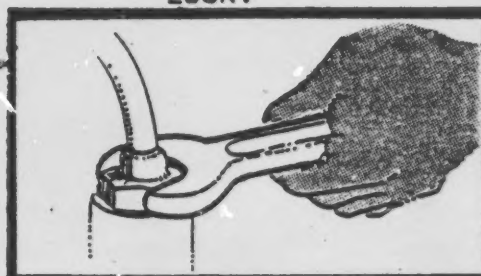
WORD GUIDE

VIBRATION - SHAKING FROM RUNNING ENGINE.

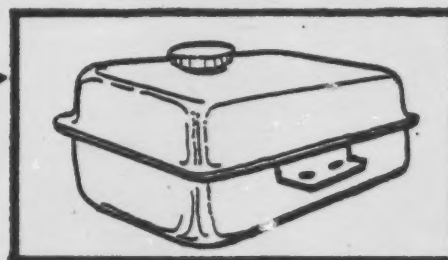
## READ:

4. USING SCREWDRIVER AND SOCKET SET, LOOSEN THE SCREWS AND BOLTS ON THE FUEL TANK.

## LOOK:

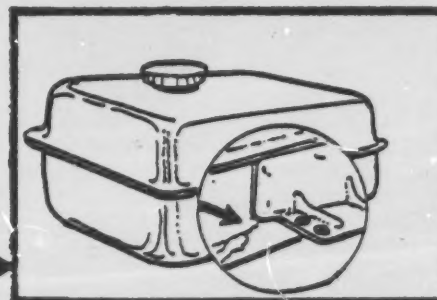


5. CAREFULLY REMOVE THE FUEL TANK FROM ITS MOUNTING.



6. NOW CHECK THE TANK FOR RUST SPOTS OR STRESS-CRACKS CAUSED BY VIBRATION.

A) LOOK CLOSELY AT SEAMS WHERE METAL PIECES JOIN TOGETHER.  
B) LOOK CLOSELY AROUND THE POINTS WHERE THE TANK IS MOUNTED TO ITS STAND OR ENGINE.



7. USING A FLASHLIGHT, LOOK INTO THE FUEL TANK. THE INSIDE SHOULD BE SHINY. IF THERE IS BROWN GUM OR DIRT ANYWHERE, CLEAN IT BY RINSING THE TANK WITH CLEAN GASOLINE OR CLEANING SOLVENT. THEN, BLOW IT DRY WITH AIR HOSE.



"TURN THE PAGE"



WORD GUIDE

VENT HOLE - SMALL HOLE IN TOP  
OF GAS CAP.

READ:

8. NOW LOOK CLOSELY AT THE FUEL  
TANK CAP. THE SMALL VENT HOLE  
IN THE CAP SHOULD BE CLEAR. IF  
IT IS CLOGGED WITH DIRT. CLEAN  
IT WITH A SMALL PIN OR LIGHT  
BLAST OF AIR FROM THE AIR HOSE.

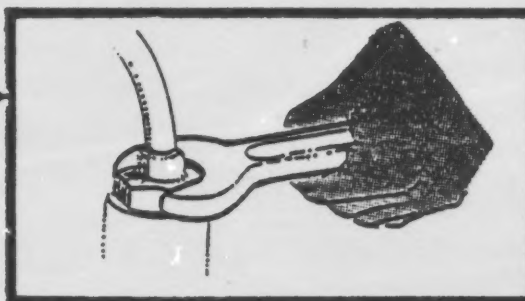
LOOK:



CHECK: SHOW YOUR INSTRUCTOR THAT YOU HAVE:

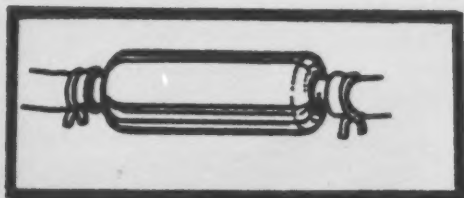
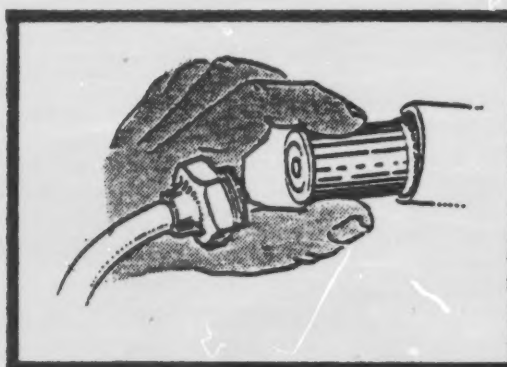
1. REMOVED THE FUEL TANK.
2. CHECKED FOR RUST AND STRESS-CRACKS.
3. MADE SURE THE INSIDE OF THE TANK IS CLEAN,  
SHINY, AND DRY.
4. MADE SURE THE VENT HOLE IN THE CAP IS CLEAR.

9. USING AN OPEN-END WRENCH, →  
REMOVE THE FUEL LINES FROM  
THE CARBURETOR.



10. REMOVE ALL FILTERS:

- 
- A) IN-LINE FILTERS ARE PART  
OF THE FUEL LINE.
  - B) THE FILTER HEAD USUALLY  
IS NEAR THE CARBURETOR.



"TURN THE PAGE"

READ:

11. CLEAN ALL FILTERS BY SOAKING THEM IN CLEAN GASOLINE OR CLEANING SOLVENT.

**NOTE:** SOAK THEM FOR ABOUT 30 MINUTES. NYLON FILTERS SHOULD NEVER BE SOAKED MORE THAN 25 MINUTES.

12. AFTER FILTERS HAVE SOAKED, RINSE IN CLEAN GASOLINE AND BLOW-DRY WITH THE AIR HOSE.



LOOK:



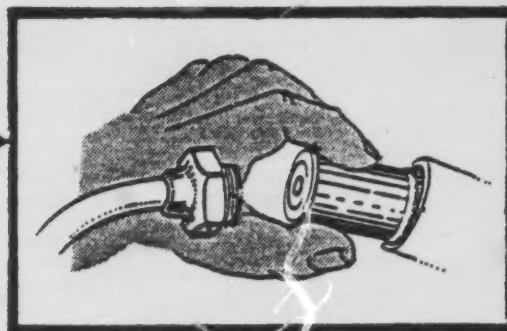
**CHECK:** ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED ALL FUEL FILTERS.
2. CLEANED, RINSED, AND BLOWN-DRY ALL FILTERS.

13. USING OPEN-END WRENCH SET, CAREFULLY PUT TOGETHER THE FILTER ASSEMBLIES.

A) PLACE THE FILTER ELEMENT INTO THE FILTER BODY.

B) TIGHTEN THE FILTER HEAD ONTO THE FILTER BODY.



**NOTE:** IF THE IN-LINE FILTER IS MADE OF NYLON, OR SOME OTHER PLASTIC MATERIAL, YOU USUALLY REPLACE IT WITH A NEW PART.

**CHECK:** ASK YOUR INSTRUCTOR TO SEE IF:

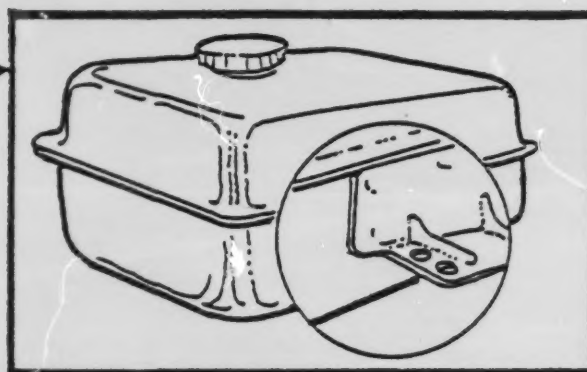
1. YOU HAVE ASSEMBLED THE FILTER HEAD AND FILTER BODY.
2. YOU SHOULD USE ANY NEW PARTS FOR IN-LINE FILTERS.

"TURN THE PAGE"

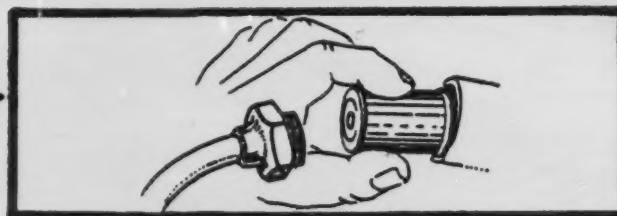
READ:

LOOK:

4. USING OPEN-END WRENCH SET, SOCKET SET AND SCREWDRIVER, REPLACE FUEL TANK ON ITS MOUNTINGS.



15. NOW CONNECT FUEL LINE OR, IF THE TANK DIRECTLY CONNECTS WITH THE CARBURETOR, BE SURE THE DRAIN PLUG IS CLOSED.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TIGHTENED FUEL TANK ON ITS MOUNTINGS.
2. CONNECTED FUEL LINE OR CLOSED THE DRAIN PLUG.

16. FILL THE TANK WITH FUEL, THEN LOOK CLOSELY AROUND SEAMS, MOUNTING POINTS, AND FUEL LINE CONNECTIONS FOR ANY LEAKS.



CHECK: SHOW YOUR INSTRUCTOR ANY LEAKS OR ASK TO CHECK YOUR WORK.

"TURN THE PAGE"

READ:

17. START THE ENGINE TO SEE IF THE CORRECT AMOUNT OF FUEL IS REACHING THE CARBURETOR. IF THE ENGINE WILL NOT START, SEE YOUR INSTRUCTOR.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT:

1. THERE ARE NO LEAKS.
2. THE CORRECT AMOUNT OF FUEL IS REACHING THE CARBURETOR.

18. PUT AWAY ALL EQUIPMENT.





# small engine repair

unit: FUEL TANK LINES

capital area career center

module: 7501 04 002 1 date: 7/77 level: 3  
7501 04 002 3

skill title: REMOVAL, REPLACEMENT, AND CHECKING FUEL LINES FOR  
WEAR AND/OR LEAKS

developed & written by: DWIGHT SMITH

visuals by: DAVE WEHRWEIN 224

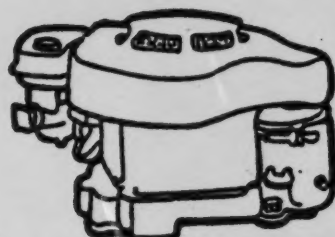


## PERFORMANCE OBJECTIVE

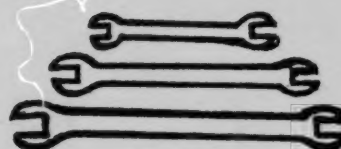
### YOU ARE GOING TO LEARN:

HOW TO REMOVE, REPLACE, AND CHECK FUEL LINES FOR WEAR AND LEAKS.

### AND IN ORDER TO DO THIS YOU WILL NEED:



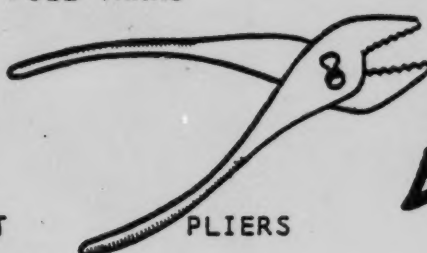
A 2- OR 4-CYCLE ENGINE WITH  
FUEL LINES AND FUEL TANKS



OPEN END WRENCH SET



SCREWDRIVER SET



PLIERS



KNIFE



SAFETY  
GLASSES

### WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED ALL THE EQUIPMENT YOU NEED FOR THIS MOD.
2. YOU HAVE REMOVED AND CHECK AND REPLACED THE FUEL LINES.
3. THE ENGINE RUNS SMOOTHLY ON THE CORRECT AMOUNT OF FUEL.
4. YOU HAVE CLEANED UP THE WORK AREA AND RETURNED ALL TOOLS AND EQUIPMENT.

"TURN THE PAGE"

WORD GUIDEIGNITED - SET ON FIRE.JOB STEPS

READ:

1. TAKE ALL EQUIPMENT AND MATERIALS TO YOUR WORK AREA.

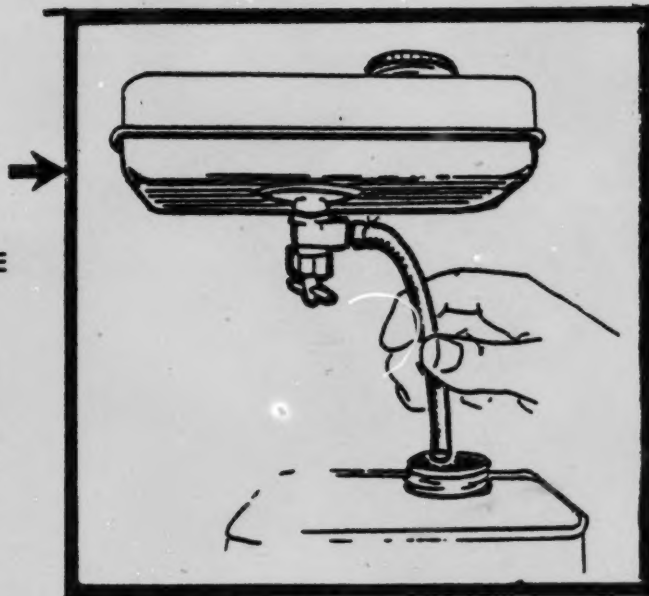
LOOK:



2. PUT A CLOSEABLE CONTAINER UNDER THE DRAIN PLUG OR FUEL LINE TO CATCH THE GAS.

WEAR YOUR SAFETY GLASSES.

3. USING THE PROPER OPEN-END WRENCH, LOOSEN THE DRAIN PLUG ON THE GAS TANK OR DISCONNECT THE FUEL LINE. LET ALL THE GAS DRAIN INTO THE CONTAINER.



\*\*\*\*\*  
 \* CAUTION! NEVER LEAVE \*  
 \* GASOLINE IN AN OPEN \*  
 \* CONTAINER WHERE IT MIGHT \*  
 \* BE IGNITED. \*  
 \* \*\*\*\*\*

CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK. BE SURE YOU HAVE:

- A. GOTTEN ALL THE EQUIPMENT YOU NEED.
- B. DRAINED ALL THE GASOLINE INTO A CLOSEABLE CONTAINER.

"TURN THE PAGE"

JOB STEPS

READ:

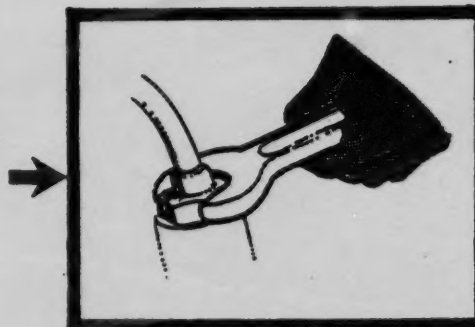
LOOK:

## 4. FIND THE FUEL LINES:

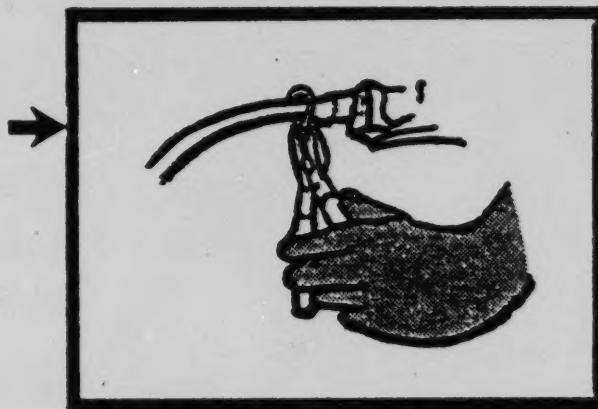
- A. FROM THE TANK TO THE FUEL PUMP;
- B. FROM THE FUEL PUMP TO THE CARBURETOR.

## 5. USING THE OPEN-END WRENCH SET, LOOSEN THE FUEL LINES.

NOTE: PLASTIC OR RUBBER LINES ARE USUALLY HELD IN PLACE BY HOSE CLAMPS. USE A SCREW-DRIVER TO LOOSEN THESE CLAMPS BEFORE PULLING THE LINE OFF THE METAL NIPPLE.



## 6. REMOVE THE FUEL LINES.



7. CHECK THE LINES CAREFULLY. LOOK FOR CRACKS OR SPLITS. CRACKS OFTEN HAPPEN WHERE THE METAL LINE CURVES OR BENDS. PLASTIC AND RUBBER LINES OFTEN SPLIT AT THE ENDS WHERE THEY FIT ONTO THE NIPPLE.

"TURN THE PAGE"

WORD GUIDE

DIAMETER - DISTANCE ACROSS A  
HOLE, PIPE. OR LINE OPENING.

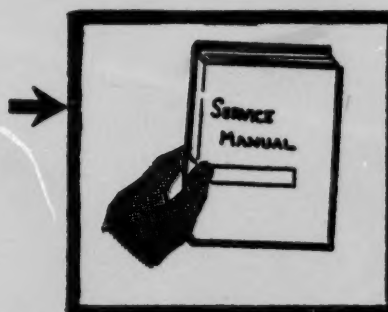
JOB STEPS

READ:

8. A. IF THE LINES ARE SPLIT OR CRACKED, THEY MUST BE REPLACED. CHECK THE ENGINE SERVICE MANUAL TO FIND THE PROPER PATH FOR THE FUEL LINE.

B. ALSO, FIND THE CORRECT DIAMETER AND LENGTH FOR ANY PLASTIC OR RUBBER LINES YOU REPLACE.

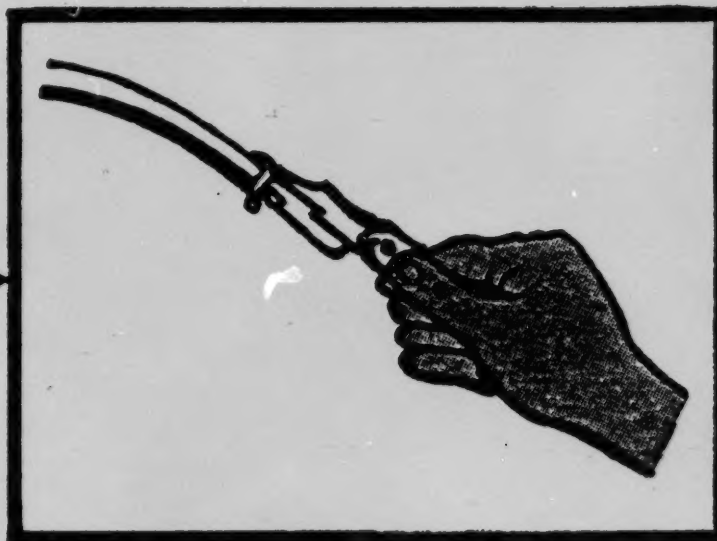
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

- A. REMOVED ALL THE FUEL LINES.
- B. CHECKED ALL THE FUEL LINES FOR CRACKS OR LEAKS.
- C. FOUND THE RIGHT SIZES FOR ANY LINES NEEDING REPLACEMENT.

9. FIT THE NEW METAL LINE BY BENDING THE LINE BEFORE YOU CONNECT IT TO THE ENGINE.



10. FOR PLASTIC OR RUBBER LINES, USE A KNIFE TO CUT THE ENDS SQUARE AND EVEN. THIS ALLOWS THE END TO SEAL TIGHTLY AND MAKE A GOOD SEAL.

NOTE: IF THE ENDS OF PLASTIC OR RUBBER LINES WERE HELD WITH HOSE CLAMPS, BE SURE TO PUT THE CLAMPS OVER THE END OF THE LINE BEFORE PUTTING THE LINE ON THE ENGINE.

"TURN THE PAGE"



JOB STEPS

READ:

LOOK:

11. USING THE PROPER OPEN-END WRENCH, TIGHTEN METAL LINES INTO PLACE.



12. USING A SCREWDRIIVER, TIGHTEN CLAMPS ON PLASTIC OR RUBBER LINES.

13. FILL THE GAS TANK 1/2 FULL WITH FUEL AND CHECK FOR LEAKS.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

- A. PROPERLY FIT THE METAL LINE TO THE ENGINE.
- B. CUT ENDS OF PLASTIC OR RUBBER TUBING SQUARE.
- C. CLAMPED THE ENDS OF THE TUBING TIGHTLY.
- D. TIGHTENED THE METAL LINES INTO PLACE.
- E. CHECKED FOR LEAKS.

"TURN THE PAGE"



JOB STEPS

READ:

14. START THE ENGINE.

LOOK:



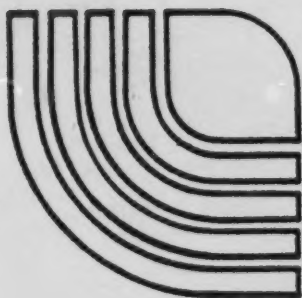
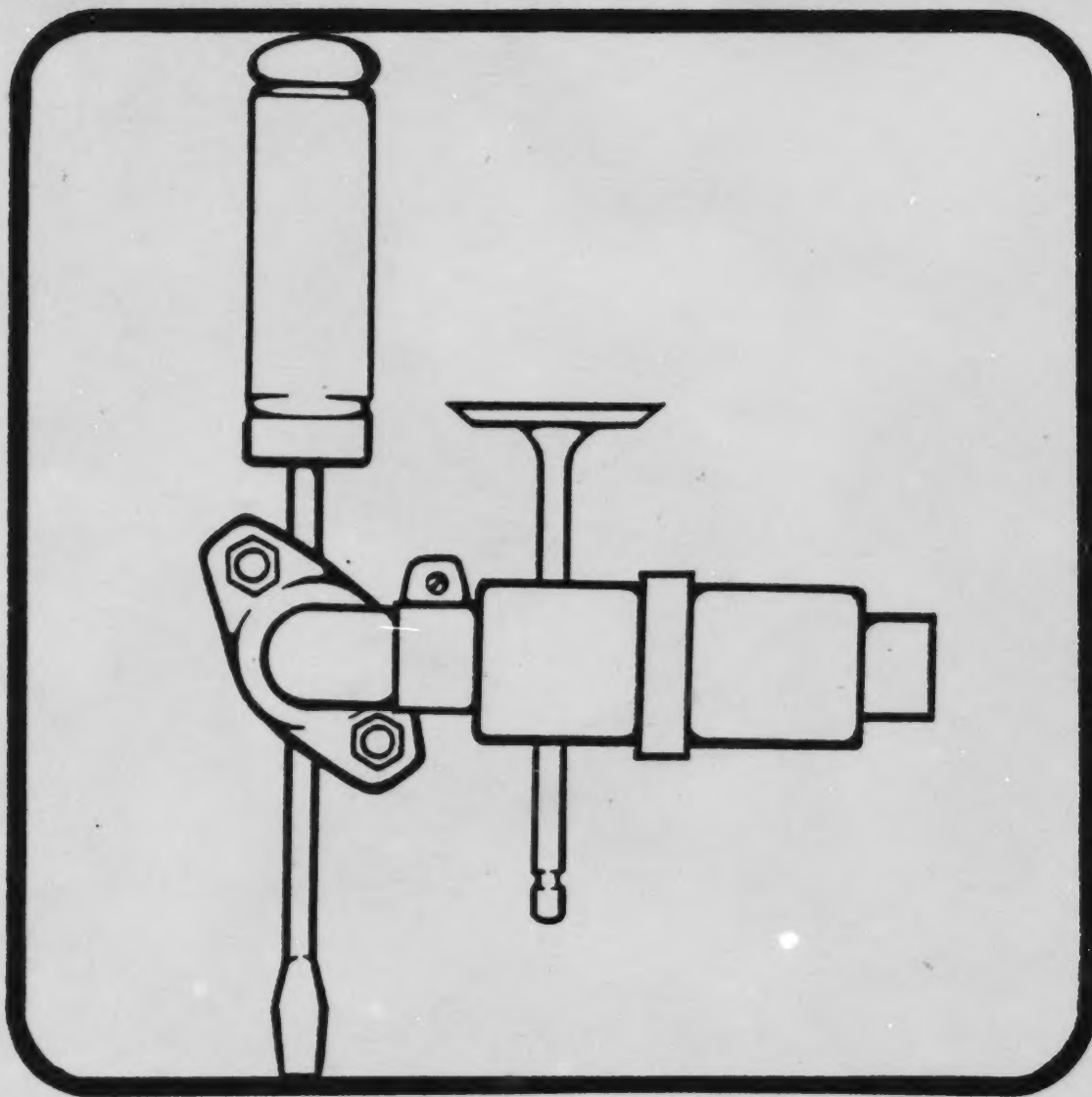
15. RE-CHECK THE FUEL LINE  
PATH AND MAKE SURE IT DOES NOT  
RUB OR INTERFERE WITH ANY  
MOVING PARTS.

16. CLEAN UP YOUR WORK AREA  
AND PUT AWAY ALL TOOLS,  
EQUIPMENT AND SUPPLIES IN THE  
RIGHT PLACE.



CHECK: ASK YOUR INSTRUCTOR TO CHECK TO SEE THAT:

- A. YOU'VE FINISHED THE JOB SO THE MACHINE WORKS CORRECTLY.
- B. YOU'VE PUT ALL TOOLS AWAY.
- C. YOU'VE CLEANED UP YOUR WORK AREA.



## small engine repair

unit: FUEL PUMPS AND FUEL FILTERS

capital area career center

module: 7501 04 003 1 7501 04 003 2 date: DECEMBER 1977 level:       

skill title: REMOVING, REPLACING AND REBUILDING FUEL PUMPS;  
CLEANING AND SERVICING SEDIMENT BOWLS

developed & written by: ANITA FLAGG AND DWIGHT SMITH

visuals by: STEVE BRAMER 231

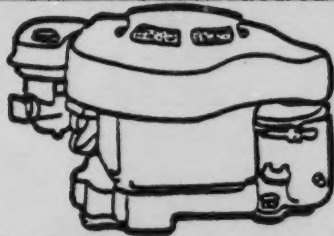
WORD GUIDE

SEDIMENT BOWL - A PLACE FOR DIRT & WATER  
TO SETTLE OUT OF THE FUEL

EXTERNAL - OUTSIDE

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

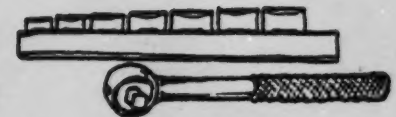
1. HOW TO REMOVE, REBUILD AND REPLACE FUEL PUMPS.
2. HOW TO CLEAN AND SERVICE SEDIMENT BOWLS.

AND IN ORDER TO DO THIS YOU WILL NEED:

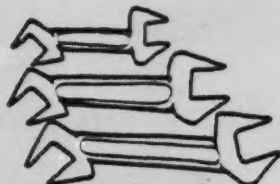
2- OR 4-CYCLE ENGINE WITH  
EXTERNAL FUEL PUMP



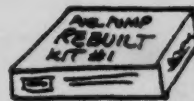
SCREWDRIVER SET



SOCKET SET



OPEN END WRENCH SET



REBUILD KIT



GREASE



SAFETY GLASSES

WE WILL KNOW THAT YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED THE MATERIALS FOR THIS MODULE.
2. YOU HAVE FOLLOWED THE JOB STEPS TO REMOVE, REBUILD, AND REPLACE A FUEL PUMP, AND CLEAN AND SERVICE A SEDIMENT BOWL.
3. CLEAN FUEL REACHES THE CARBURETOR, IN THE PROPER AMOUNT, AND THERE ARE NO FUEL OR OIL LEAKS.

"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

1. GATHER ALL THE EQUIPMENT AND BRING IT TO THE WORK AREA.



2. PUT ON YOUR SAFETY GLASSES.



3. DRAIN THE FUEL TANK. YOU DO THIS BY LOOSENING THE DRAIN PLUG OR BY TAKING OFF THE FUEL LINE.



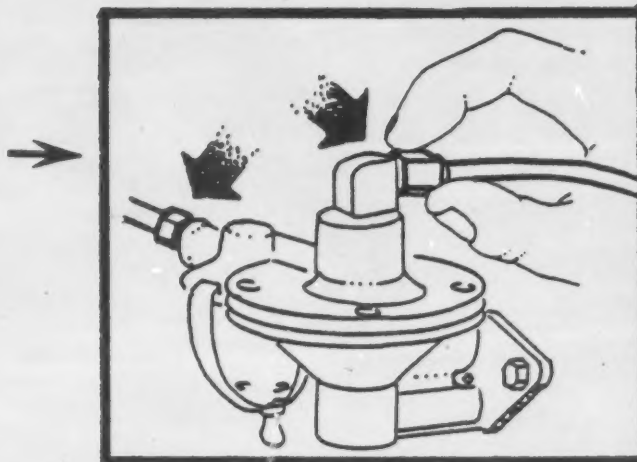
"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

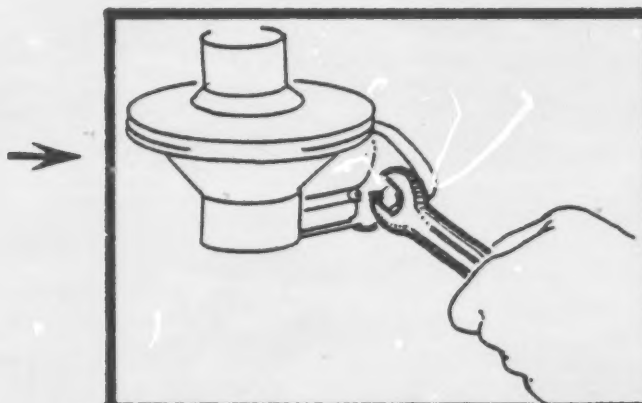
4. DISCONNECT THE FUEL LINES THAT GO TO THE PUMP. USE A PAN TO CATCH ANY GAS LEAKING OUT OF THESE LINES.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

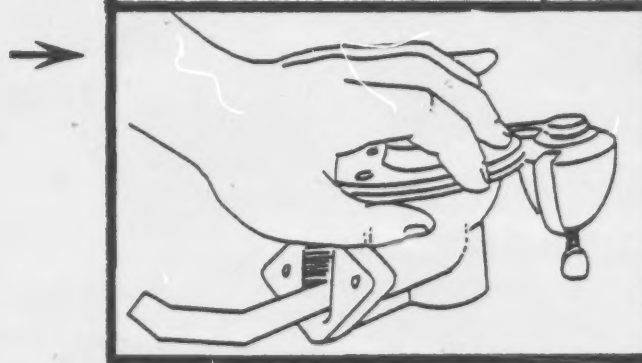
1. ALL THE EQUIPMENT YOU NEED.
2. YOUR SAFETY GLASSES ON.
3. DRAINED THE FUEL TANK AND DISCONNECTED THE FUEL LINE.

5. USE A WRENCH TO TAKE OUT THE BOLTS OR NUTS HOLDING THE PUMP.



6. TAKE THE FUEL PUMP OUT AND PUT IT ON THE WORK BENCH.

NOTE: MANY FUEL PUMPS HAVE THE SEDIMENT BOWL BUILT IN. WHEN YOU HAVE THE PUMP OFF, ALWAYS CLEAN AND SERVICE THE SEDIMENT BOWL AS IN STEP 7.





WORD GUIDE

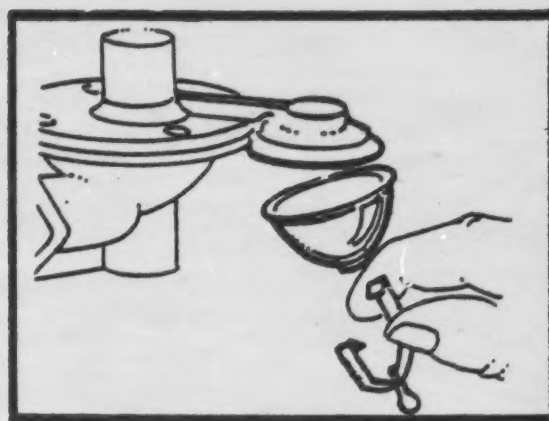
YOKE - USUALLY "Y"-SHAPED, FITS AROUND AND HOLDS SOMETHING IN PLACE

JOB STEPS

READ:

LOOK:

7. LOOSEN THE SCREW THAT HOLDS THE YOKE AND THE SEDIMENT BOWL. TAKE THE BOWL OFF.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE FUEL PUMP.
2. TAKEN OFF THE SEDIMENT BOWL AND CLEANED IT.

8. LOOK AT THE 2 GASKETS THAT SEAL THE BOWL. REPLACE THEM IF THEY ARE CRACKED OR TORN.

9. SOAK THE SCREEN, BOWL AND PUMP VALVE IN GASOLINE OR CLEANING SOLUTION FOR 30 MINUTES.



## WORD GUIDE



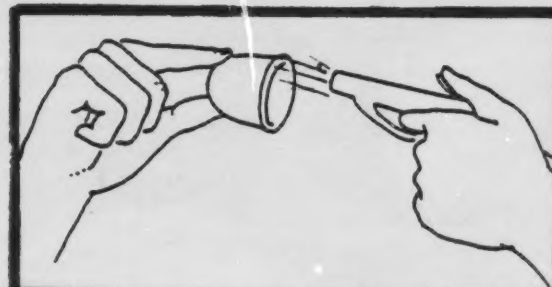
DIAPHRAGM - A FLEXIBLE "SKIN"  
THAT IS USED TO PUMP

JOB STEPS

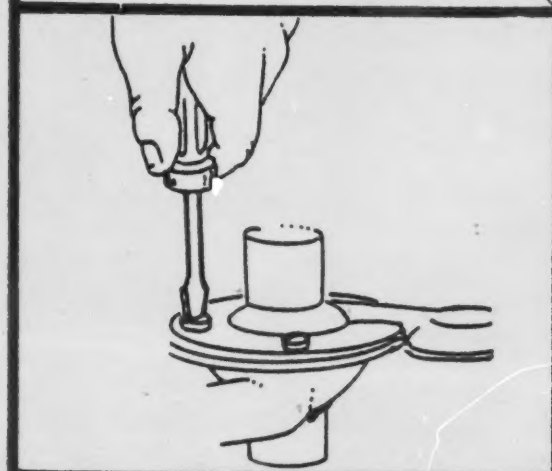
READ:

LOOK:

10. USE THE COMPRESSED AIR HOSE  
TO DRY THE SCREEN, PUMP VALVE  
AND BOWL.



11. USE A SCREWDRIVER OR SOCKET  
TO REMOVE THE SCREWS OR BOLTS  
THAT HOLD THE TWO PARTS OF THE  
PUMP TOGETHER. TAKE OFF TOP  
PART.



12. USE A SCREWDRIVER TO  
REMOVE THE SCREWS IN THE  
PLATE. REMOVE THE PLATE.



\*\*\*\*\*  
\* CAUTION: DO NOT PULL ON THE DIAPHRAGM. IT IS \*  
\* CONNECTED TO THE LEVER AND WILL BREAK \*  
\* IF PULLED. \*  
\*\*\*\*\*

"TURN THE PAGE"

JOB STEPS

READ:

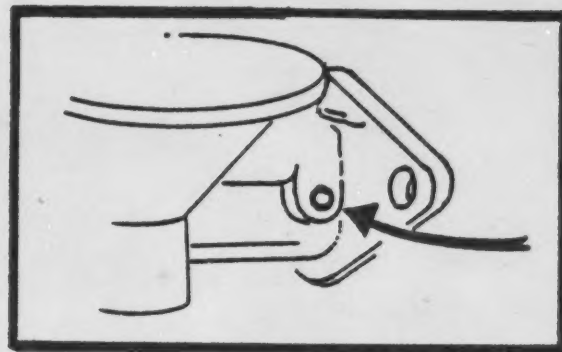
LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

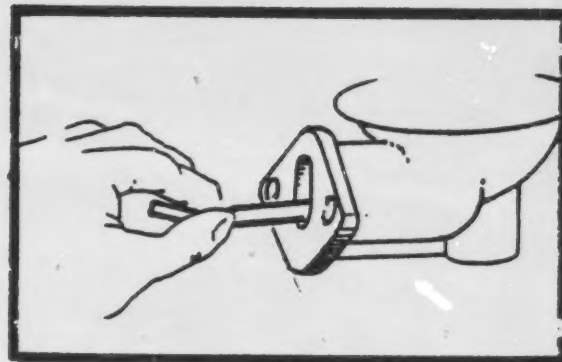
1. REPLACED THE GASKETS IF NEEDED.
2. CLEANED THE SCREEN, PUMP VALVES AND BOWL.
3. TAKEN THE TWO PARTS OF THE PUMP APART.

13. REPLACE THE PUMP VALVES.

14. LAY THE PUMP ON ITS SIDE.  
USE A SMALL DRIFT PIN AND A  
HAMMER AND DRIVE THE LEVER PIN  
OUT OF THE HOLE.



15. PUSH GENTLY ON THE DIAPHRAGM  
WITH YOUR THUMB AND TAKE THE PUMP  
LEVER OUT.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CLEANED THE PUMP VALVE.
2. REMOVED THE DRIFT PIN WITHOUT DAMAGING IT.
3. TAKEN THE PUMP LEVER OUT.

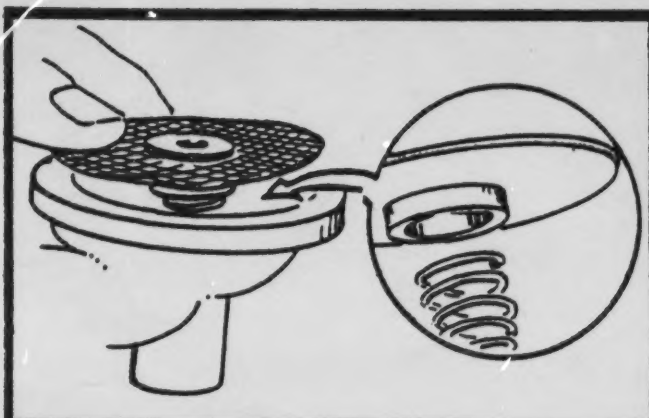
"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

16. TAKE OUT THE DIAPHRAGM, THE DIAPHRAGM SPRING, AND THE LEVER SPRING. BE SURE TO NOTICE CAREFULLY HOW THE PARTS COME APART SO YOU WILL BE ABLE TO PUT THEM TOGETHER.



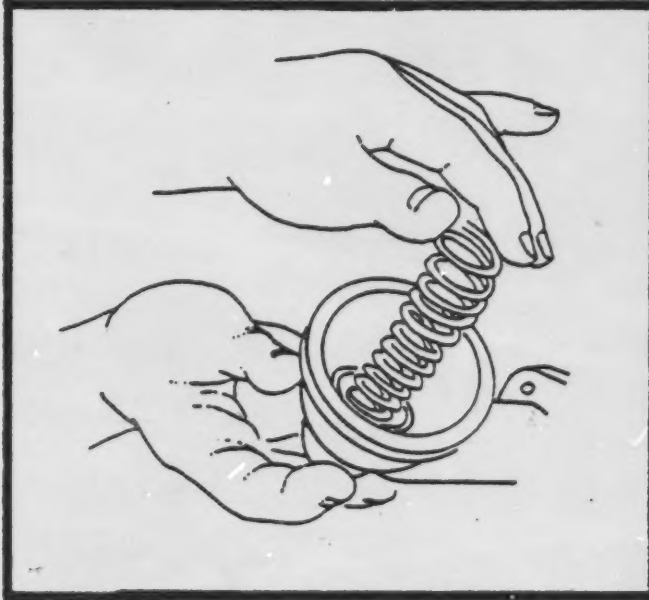
17. USE ALL THE PARTS FROM THE REBUILD KIT THAT ARE THE SAME AS THE OLD ONES.



18. PUT THE DIAPHRAGM SPRING IN ITS HOLDER ON THE LOWER PART OF THE PUMP.



19. PUT THE NEW DIAPHRAGM ON THE SPRING. BE SURE THE SPRING IS IN ITS HOLDER ON THE DIAPHRAGM.



"TURN THE PAGE"

JOB STEPS

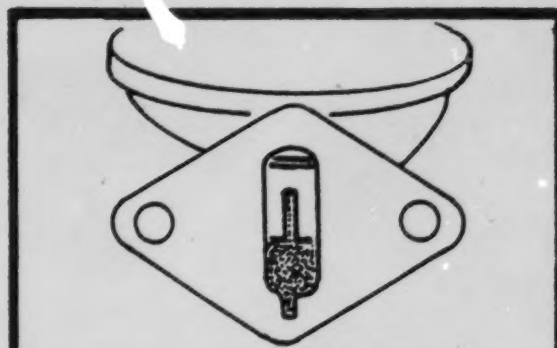
READ:

LOOK:

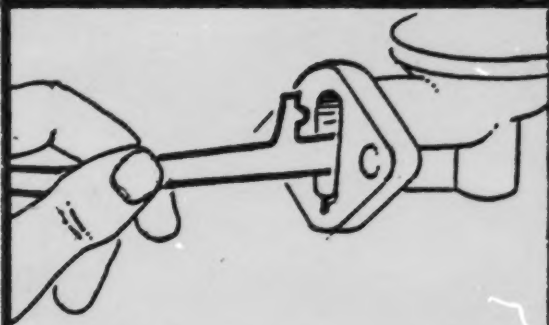
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN ALL THE OLD PARTS OUT.
2. PUT THE NEW DIAPHRAGM SPRING IN PROPERLY.
3. PUT THE DIAPHRAGM IN.

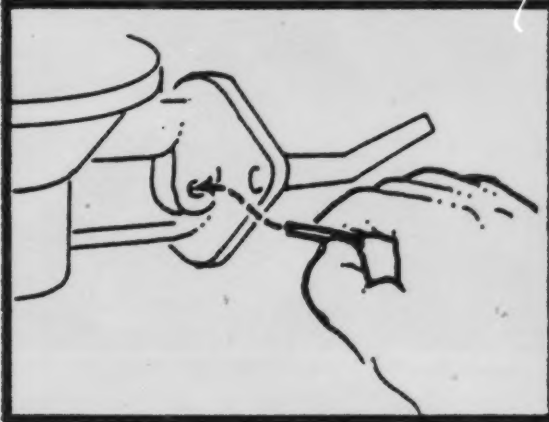
20. LOOK IN THE PUMP LEVER  
OPENING. PUSH CAREFULLY ON THE  
DIAPHRAGM AND TURN IT UNTIL YOU  
SEE THE SLOT IN THE SHAFT.



21. PUT THE HOOKED END OF THE  
PUMP LEVER INTO THE SLOT.



22. LINE UP THE HOLES IN THE PUMP  
AND IN THE LEVER.



"TURN THE PAGE"

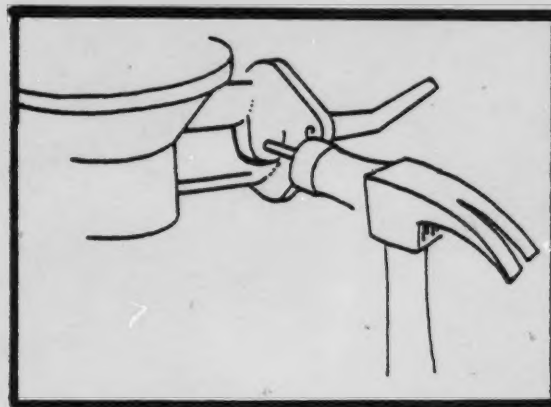


JOB STEPS

READ:

LOOK:

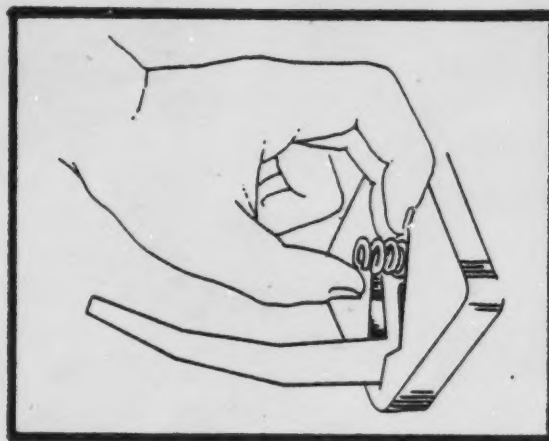
23. USE THE HAMMER AND CAREFULLY  
DRIVE THE PIN INTO PLACE.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT THE PUMP LEVER IN RIGHT.
2. DRIVEN IN THE PIN WITHOUT WRECKING THE PUMP.

24. PUT THE NEW LEVER SPRING ON  
THE LEVERSPRING PIN INSIDE THE  
PUMP.



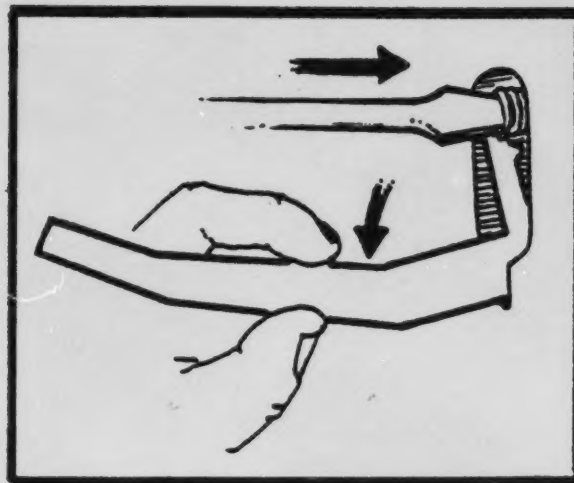
"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

25. USE A SCREWDRIVER TO PUSH THE SPRING DOWN AND LIFT THE PUMP LEVER TO HOLD THE SPRING IN.



26. MOVE THE PUMP LEVER AND CHECK ITS ACTION. IF IT WORKS RIGHT, GO ON. IF NOT, ASK YOUR INSTRUCTOR FOR HELP.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT THE SPRING IN THE PUMP PROPERLY.
2. THE PUMP LEVER AND DIAPHRAGM CONNECTED PROPERLY AND WORKING.

27. PUT THE PUMP VALVE AND GASKET IN THE UPPER PART OF THE PUMP. REPLACE THE PLATE.



"TURN THE PAGE"

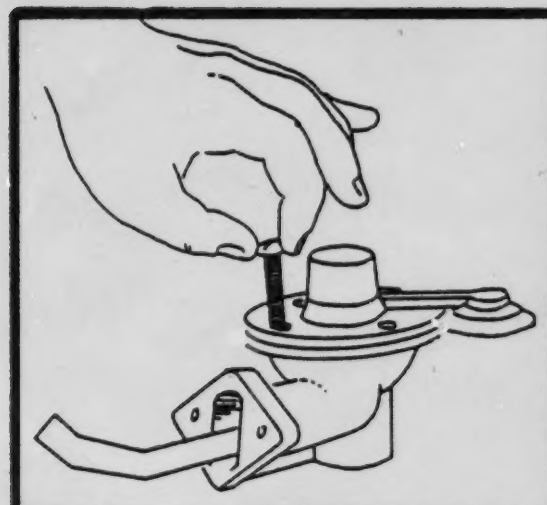
JOB STEPS

READ:

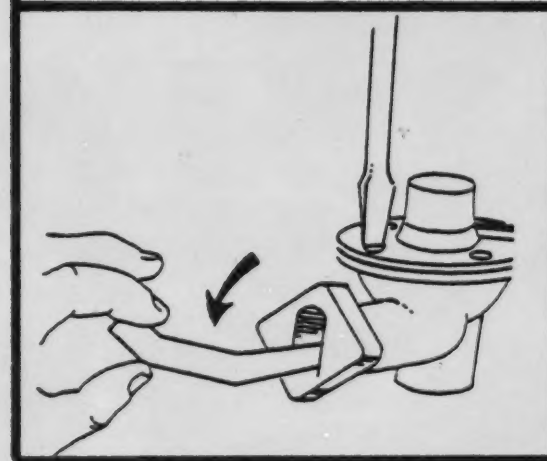
LOOK:

28. LINE UP THE HOLES FOR THE SCREWS.

29. START THE SCREWS OR BOLTS INTO THE HOLES.



30. USE A SCREWDRIVER AND EVENLY TIGHTEN THE SCREWS THAT HOLD THE PARTS TOGETHER. PUSH DOWN ON THE PUMP LEVER AS SHOWN.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT THE PUMP VALVE AND GASKET IN.
2. PUT THE TWO PARTS (UPPER AND LOWER) TOGETHER.

"TURN THE PAGE"

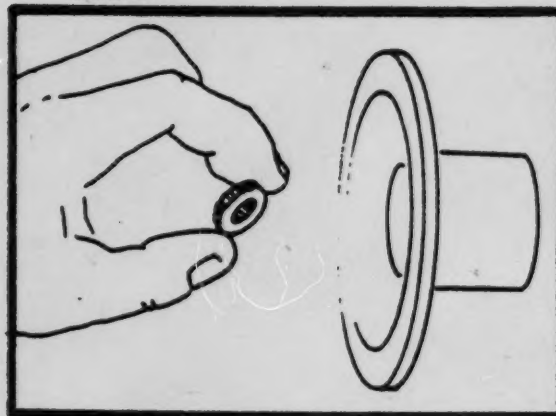
JOB STEPS

READ:

31. PUT THE PUMP VALVE AND GASKET  
IN THE SEDIMENT BOWL.

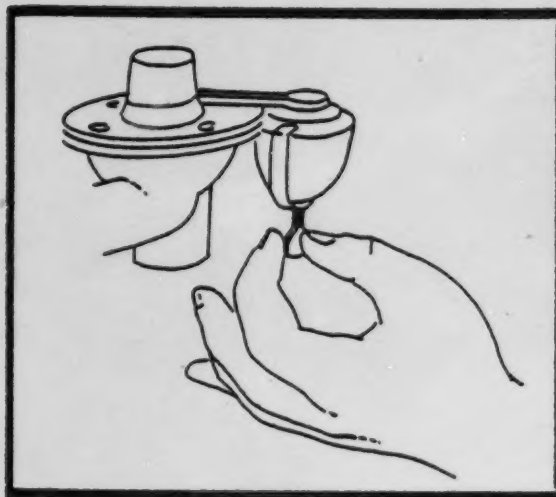


LOOK:



32. PUT THE SCREEN AND GASKET  
ON TOP OF THE BOWL AND BRING  
IT UP TO THE PUMP BODY.

33. HOLD THE BOWL AND TIGHTEN  
THE SET SCREW ON THE YOKE.



34. PUT A SMALL LUMP OF GREASE  
(THE SIZE OF A BB) ON THE END  
OF THE PUMP LEVER.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT THE PUMP VALVE AND GASKET IN.
2. PUT THE SEDIMENT BOWL ON RIGHT.
3. GREASED THE PUMP LEVER.

"TURN THE PAGE"

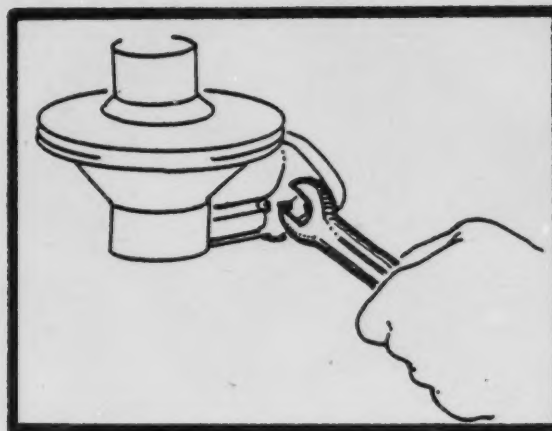
JOB STEPS

READ:

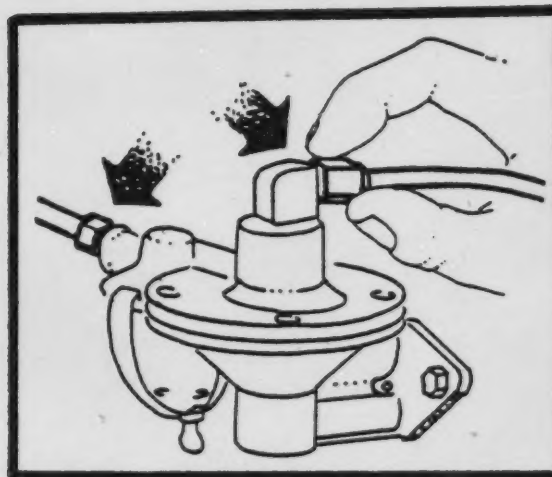
LOOK:

35. PUT THE FUEL PUMP ON ITS MOUNT.

36. INSTALL THE BOLTS AND TIGHTEN THEM.



37. CONNECT THE FUEL LINES.  
ONE BRINGS GAS FROM THE TANK,  
THE OTHER TAKES IT TO THE  
CARBURETOR.



38. PUT THE DRAIN PLUG BACK IN  
THE FUEL TANK.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT IN THE FUEL PUMP AND BOLTED IT DOWN.
2. CONNECTED THE FUEL LINES.
3. PUT THE DRAIN PLUG IN.

"TURN THE PAGE"



JOB STEPS

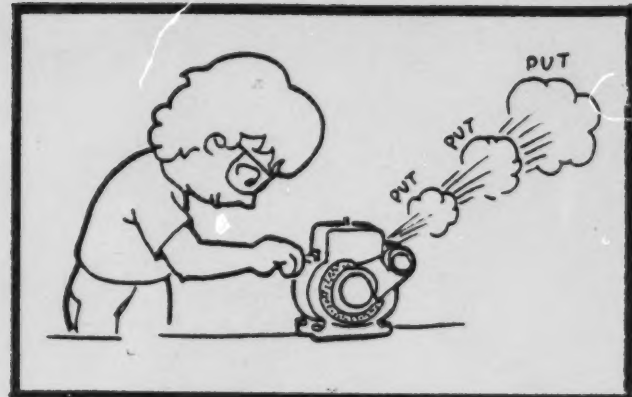
READ:

LOOK:

39. FILL THE GAS TANK 1/2 FULL  
WITH FUEL.



40. START THE ENGINE.



41. LOOK CAREFULLY FOR ANY GAS  
OR OIL LEAKS. CHECK CONNECTORS  
AND GASKET AREAS.



JOB STEPS

READ:

42. IF THERE ARE ANY LEAKS, SHUT THE ENGINE OFF. IF THERE NO LEAKS, ASK YOUR INSTRUCTOR TO CHECK YOUR WORK.



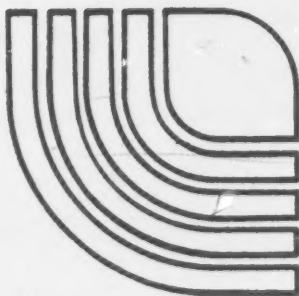
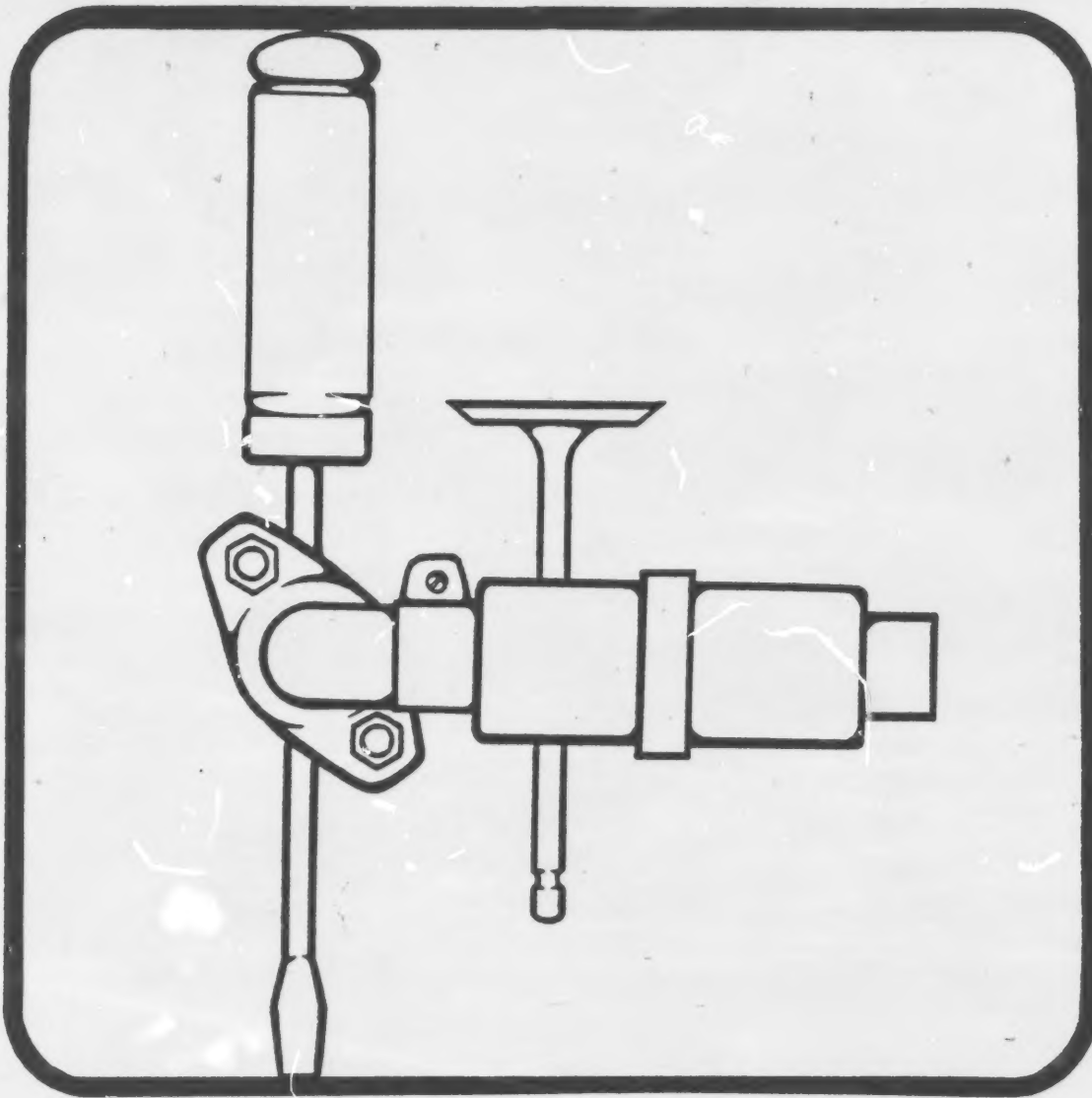
LOOK:



43. IF THE JOB IS COMPLETE, PUT AWAY ALL THE TOOLS AND MATERIALS AND CLEAN UP THE WORK AREA.



CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK.



## small engine repair

unit: CARBURETOR

capital area career center

module: 7501 05 001 1 7501 05 001 3 date: OCTOBER 1977 level: I

skill title: CARBURETOR OVERHAUL (BOWL-FLOAT TYPE)

developed & written by: A. STEINBERG

visuals by: DAVE WEHRWEIN 217

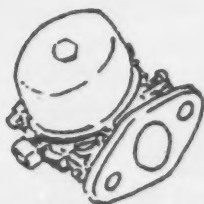
WORD GUIDE  
GUIDELINES - RULES

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

HOW TO TAKE APART AND FIX BOWL-FLOAT TYPE CARBURETORS ON  
A 2-CYCLE ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:



BOWL-FLOAT TYPE  
CARBURETOR



FEELER GAUGE



HAND TOOLS



SERVICE MANUAL



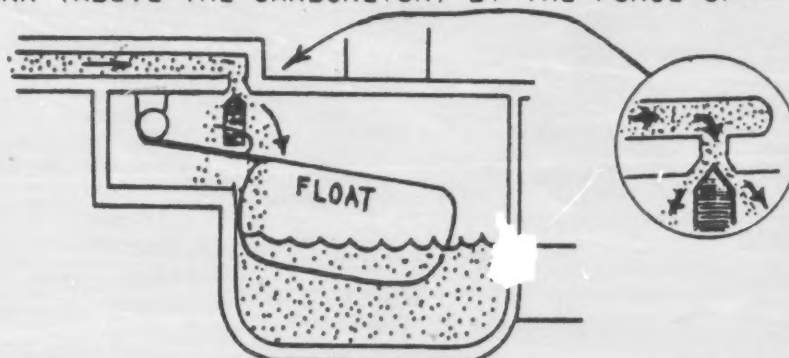
SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

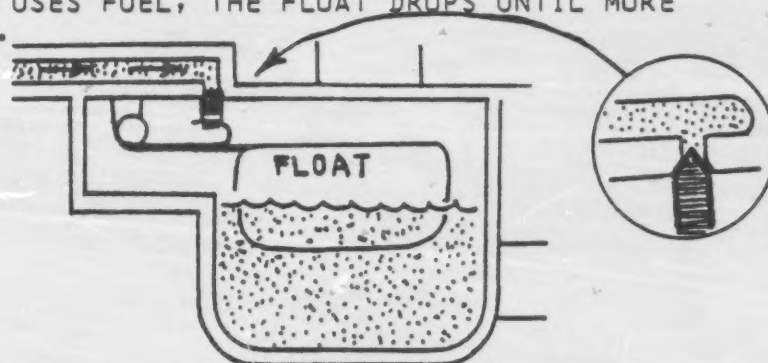
1. YOU HAVE ALL YOUR EQUIPMENT.
2. YOU HAVE TAKEN APART AND FIXED THE CARBURETOR TO THE  
MANUAL'S GUIDELINES SO IT WORKS PROPERLY ON THE ENGINE.

WORD GUIDEGRAVITY - WEIGHTINFORMATION

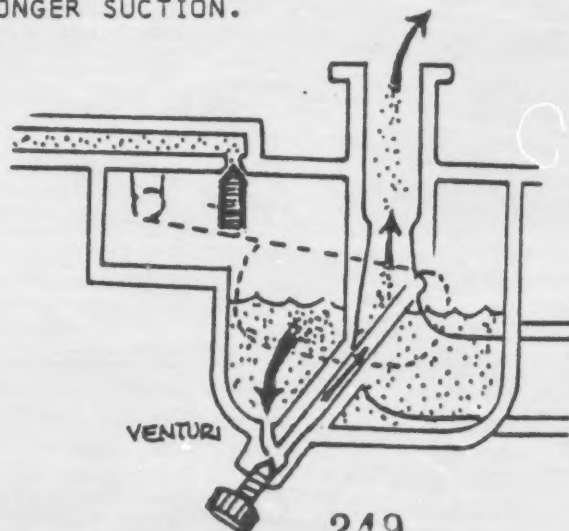
A BOWL-TYPE CARBURETOR IS ALSO CALLED A FLOAT-TYPE CARBURETOR. IN THIS CARBURETOR, FUEL FLOWS INTO THE CARBURETOR INLET VALVE FROM THE FUEL TANK (ABOVE THE CARBURETOR) BY THE FORCE OF GRAVITY.



WHEN THE BOWL IS FULL, THE FLOAT LIFTS AND CLOSSES THE VALVE. WHEN THE ENGINE RUNS AND USES FUEL, THE FLOAT DROPS UNTIL MORE FUEL COMES INTO THE BOWL.



FUEL MOVES INTO THE ENGINE THROUGH A VACUUM (SUCTION) CREATED WHEN THE PISTON GOES DOWN AS THE INTAKE VALVE OPENS. THE THIN PART IN THE CARBURETOR, THE "VENTURI", MOVES THE AIR FASTER BECAUSE OF STRONGER SUCTION.

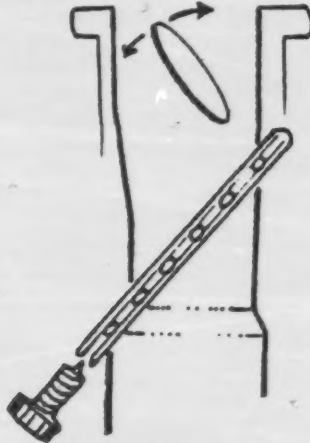


"TURN THE PAGE"

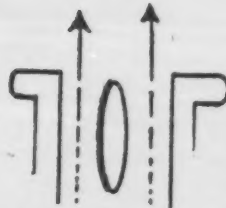


INFORMATION

THE THROTTLE PLATE CONTROLS THE AMOUNT OF AIR COMING INTO THE ENGINE. A SMALL AMOUNT OF AIR AND FUEL GOES IN WHEN THE THROTTLE PLATE IS CLOSED.



WHEN THE THROTTLE PLATE IS OPEN, A LOT OF AIR AND FUEL COME INTO THE ENGINE.



SINCE THERE ARE MANY KINDS OF BOWL-TYPE CARBURETORS FOR 2-CYCLE ENGINES (BRIGGS & STRATTON, CLINTON, TECUMSEH, ETC.), YOU WILL NEED A SERVICE MANUAL FOR THE ONE YOU WILL WORK ON.

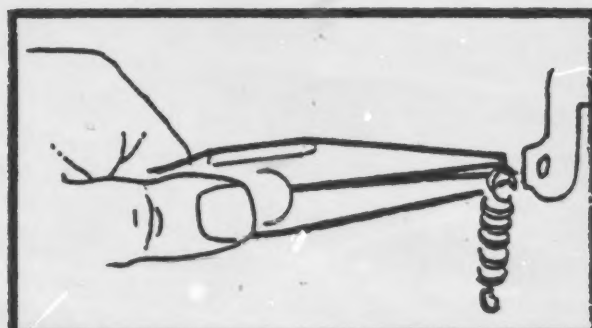
THE CARBURETOR FOR THIS MOD IS THAT OF A BRIGGS & STRATTON, 2-CYCLE ENGINE.

"TURN THE PAGE"

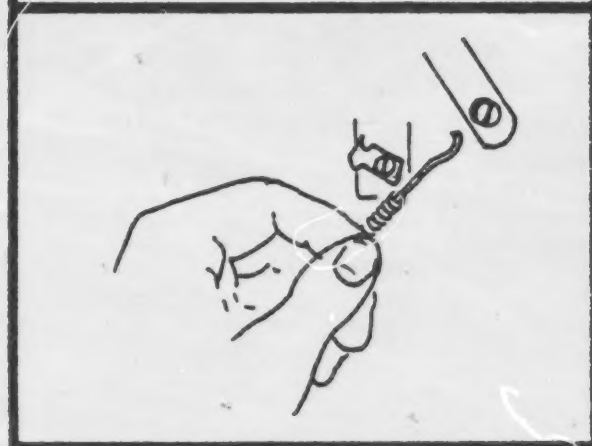
JOB STEPSREAD:LOOK:

1. GET ALL YOUR EQUIPMENT  
AND TAKE IT TO YOUR WORK  
AREA.

2. TAKE OFF THE GOVERNOR  
CONTROL LINK AND SPRING.



3. TAKE OFF THE THROTTLE AND  
CHOKE LINKAGE.



4. REMOVE THE CARBURETOR FROM  
THE ENGINE. WEAR SAFETY GLASSES.

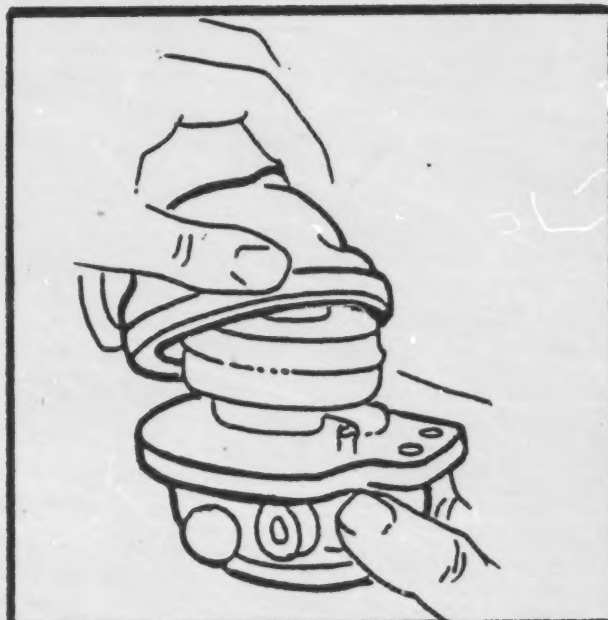
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. REMOVED THE CARBURETOR.
3. TAKEN OFF THE GOVERNOR CONTROL LINK AND SPRING.
4. TAKEN OFF THE THROTTLE AND CHOKE LINKAGE.
5. YOUR SAFETY GLASSES ON.

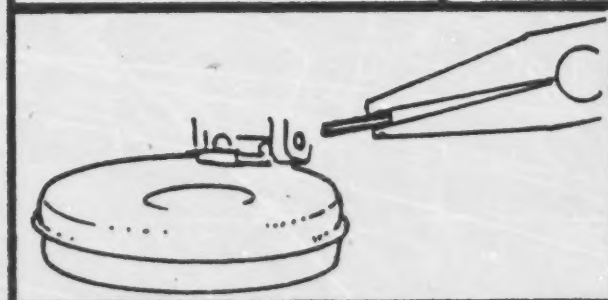
"TURN THE PAGE"

JCB STEPSREAD:

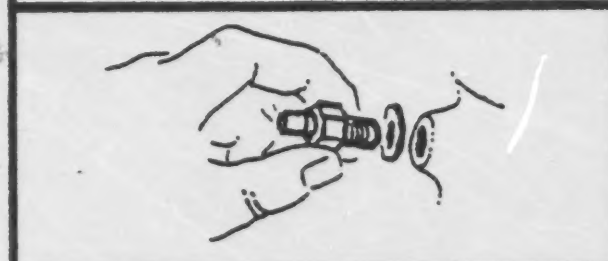
5. TAKE OFF THE BOWL AND THE TOP OF THE BOWL FROM THE CARBURETOR BODY.

LOOK:

6. TAKE THE FLOAT HINGE PINS, FLOAT AND NEEDLE VALVE OUT OF THE BOWL.



7. TAKE THE INLET SEAT AND GASKET OUT OF THE BOWL.



8. IF THE INLET HAS A FILTER SCREEN, TAKE THAT OUT TOO.

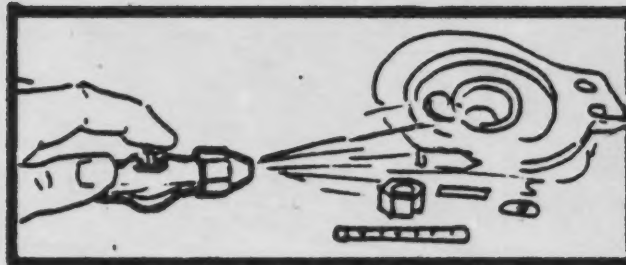


"TURN THE PAGE"

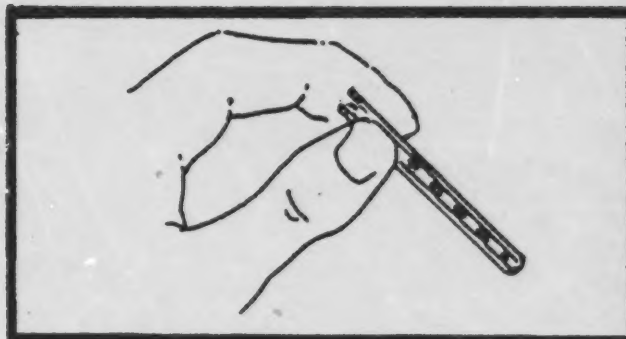
JOB STEPSREAD:LOOK:

9. PUT ALL METAL PARTS IN CARBURETOR CLEANER FOR 5 - 10 MINUTES.

10. USING AN AIR GUN, BLOW DIRT AND CLEANER OFF ALL PARTS.



11. REMOVE NEEDLES, LINKAGE OR ANY OTHER PARTS FROM THE CARBURETOR BODY.



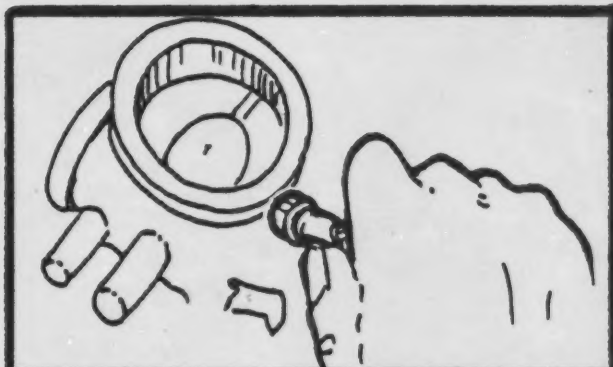
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OUT THE BOWL, FLOAT, NEEDLE VALVE, INLET SEAT AND GASKET FROM THE BOWL AND CARBURETOR BODY.
2. SOAKED THE METAL PARTS IN CARBURETOR CLEANER 5 - 10 MINUTES.

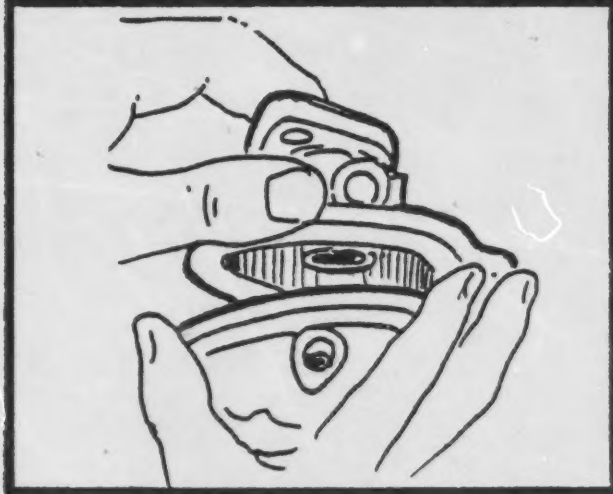
"TURN THE PAGE"

JOB STEPSREAD:LOOK:

12. REMOVE THE MAIN NOZZLE.



13. TAKE THE UPPER BODY OFF THE LOWER BODY.



14. PUT THE CARBURETOR BODY IN CLEANER FOR 5 - 10 MINUTES.

15. BLOW AND WIPE DIRT AND CLEANER FROM THE CARBURETOR BODY.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE MAIN NOZZLE.
2. TAKEN THE UPPER BODY OFF THE LOWER BODY.
3. CLEANED THE CARBURETOR BODY.

"TURN THE PAGE"



WORD GUIDE

WEAR - DAMAGE, BREAKS, ETC.

WARPS - BENDS, TWISTS.

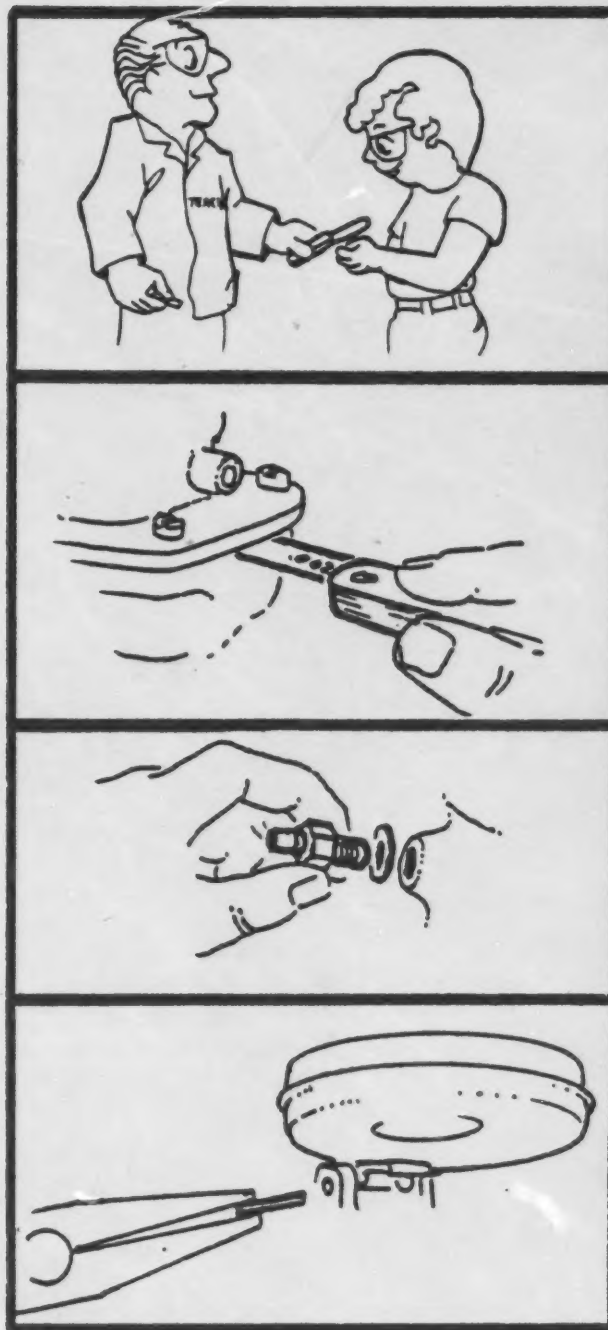
JOB STEPSREAD:

16. USE THE FEELER GAUGE TO CHECK THE THROTTLE SHAFT AND BUSHINGS FOR WEAR. ASK YOUR INSTRUCTOR TO SHOW YOU HOW TO USE THE FEELER GAUGE.

17. CHECK THE UPPER BODY FOR WARPS.

18. PUT BACK THE FILTER SCREEN. PUT IN A NEW INLET SEAT AND GASKET, IF YOU HAVE THEM.

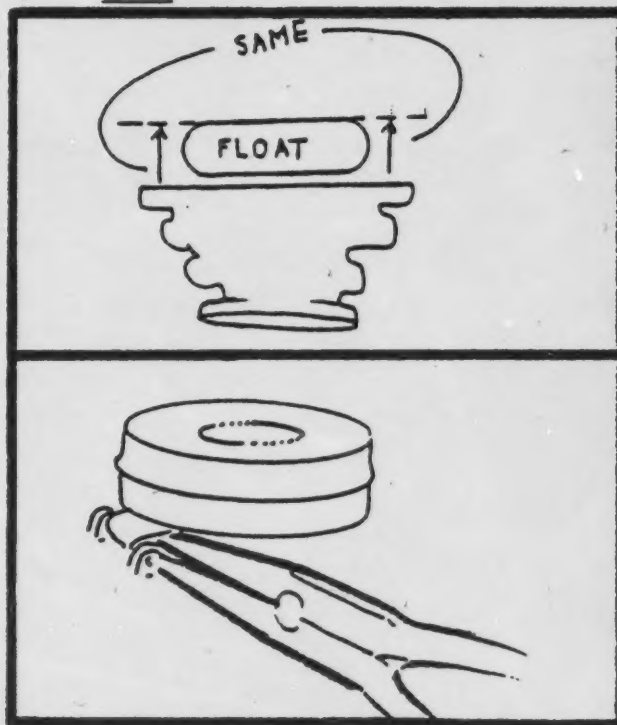
19. PUT IN THE NEEDLE VALVE, FLOAT AND FLOAT HINGE PIN.

LOOK:

"TURN THE PAGE"

JOB STEPSREAD:

20. BEND THE FLOAT (TANG) TO  
LEVEL THE FLOAT (CHECK MANUAL).

LOOK:

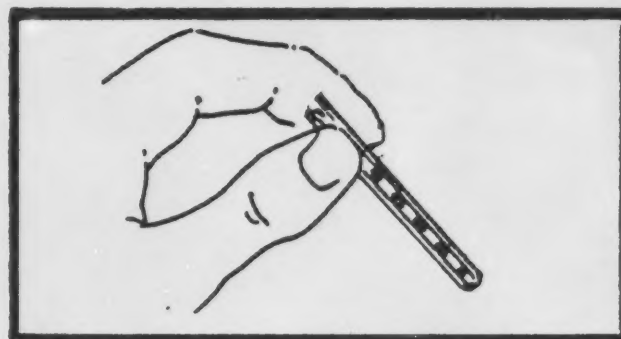
21. CONNECT THE UPPER AND LOWER  
BODIES AGAIN.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE THROTTLE SHAFT, BUSHINGS AND UPPER BODY FOR DAMAGE.
2. PUT IN A FILTER SCREEN, INLET SEAT AND GASKET.
3. PUT IN A NEEDLE VALVE, FLOAT AND FLOAT HINGE PIN.
4. SET THE FLOAT.
5. CONNECTED UPPER AND LOWER BODIES AGAIN.

22. PUT IN THE MAIN NOZZLES.  
PUT IN NEW ADJUSTING NEEDLES  
AND GASKETS, IF YOU HAVE THEM.



"TURN THE PAGE"

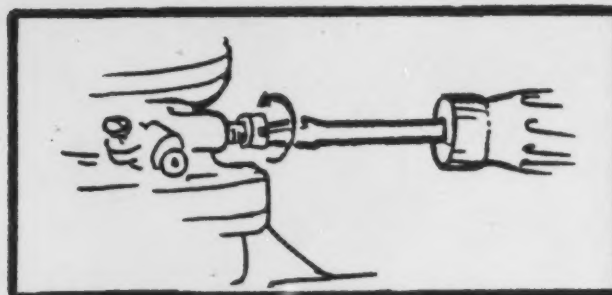
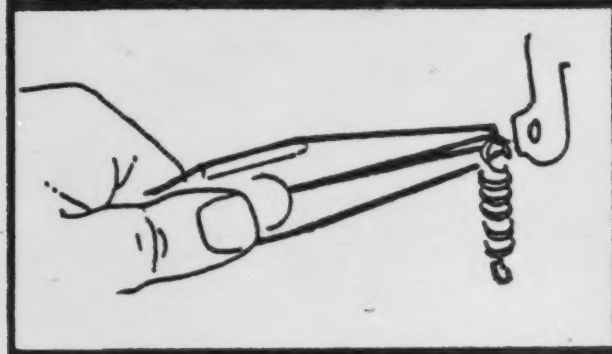
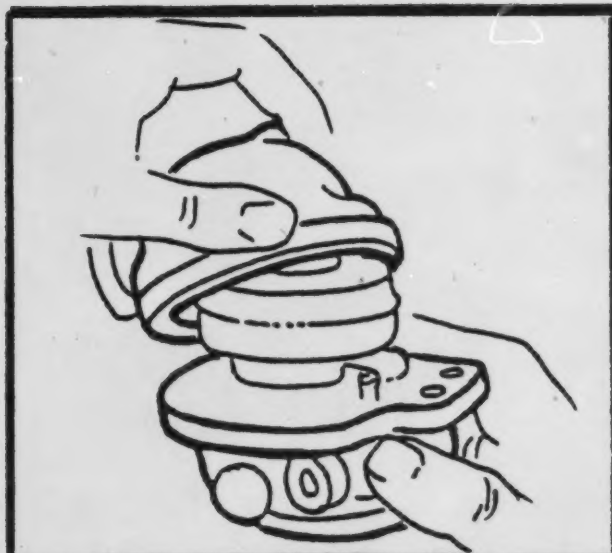
JOB STEPSREAD:

23. PUT THE BOWL ON THE MAIN BODY.

24. PUT THE CARBURETOR BACK ON THE ENGINE.

25. PUT ON THE CHOKE, THROTTLE, GOVERNOR LINK AND GOVERNOR SPRING.

26. TURN THE IDLE NEEDLE ALL THE WAY IN AND THEN BACK IT OFF 3/4 TURN.

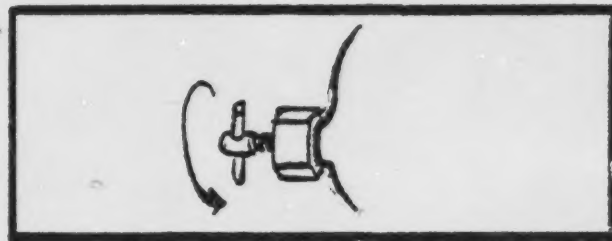
LOOK:

"TURN THE PAGE"

JOB STEPSREAD:

27. TURN THE POWER NEEDLE ALL THE WAY IN AND THEN BACK IT OFF 1 1/2 TURNS.

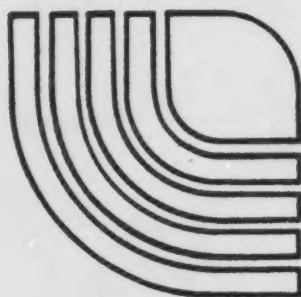
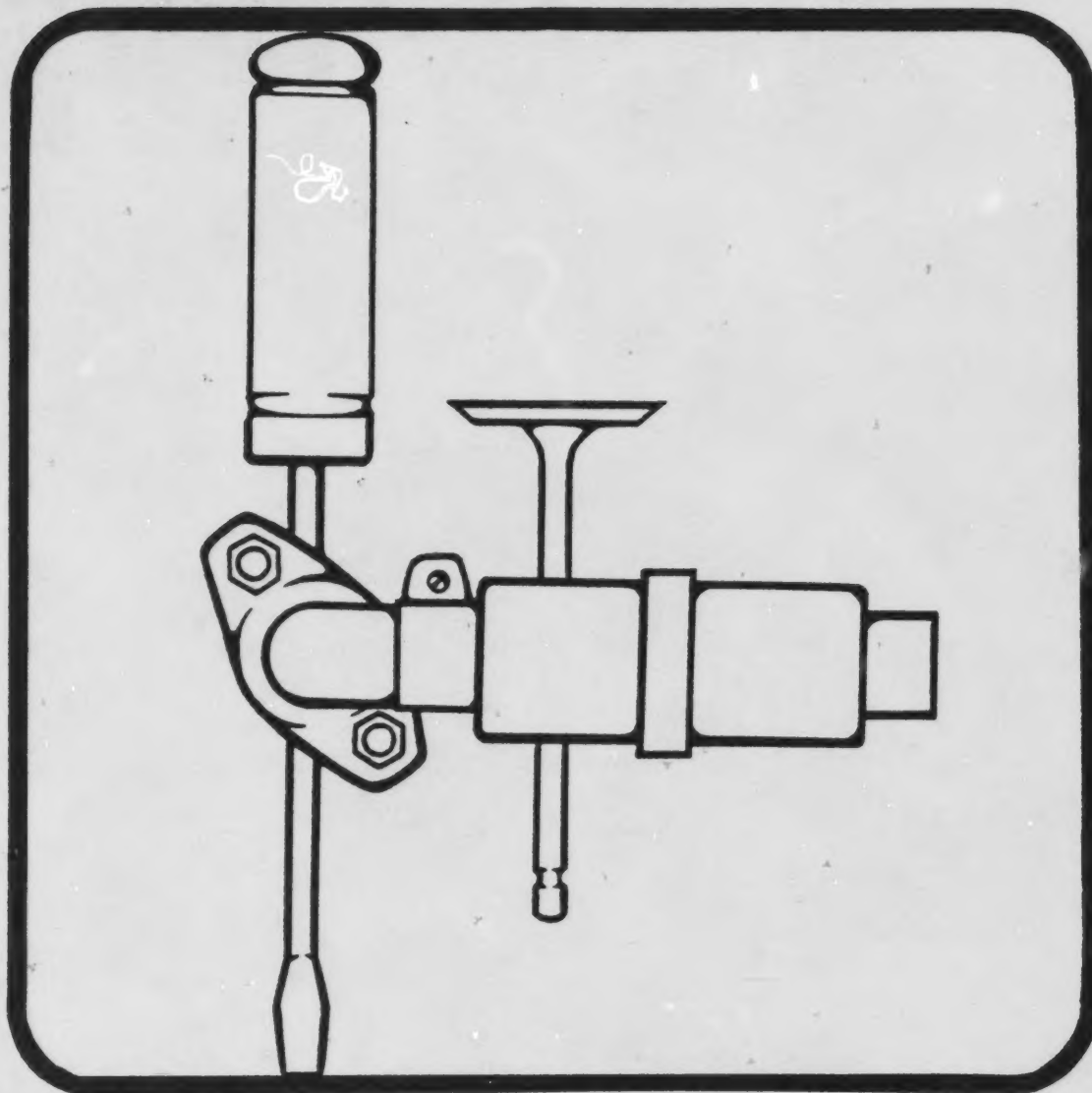
NOTE: THE NEXT 2 STEPS START AND RUN THE ENGINE. WHEN IT RUNS, FOLLOW THE STEPS IN MODS 7501 05 007 1 AND 7501 05 007 3.

LOOK:

28. GET YOUR INSTRUCTOR AND START THE ENGINE. SET THE CARBURETOR BY FOLLOWING THE STEPS IN MODS 7501 05 007 1 AND 7501 05 007 3.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT IN THE MAIN NOZZLE, ADJUSTING NEEDLES, AND GASKETS.
2. PUT THE BOWL ON THE MAIN BODY.
3. PUT THE CARBURETOR BACK ON THE ENGINE.
4. PUT ON THE CHOKE, THROTTLE, GOVERNOR LINK, AND GOVERNOR SPRING.
5. TURNED THE IDLE NEEDLE AND POWER NEEDLE ACCORDING TO THE MANUAL GUIDELINES.



## small engine repair

unit: CARBURETOR

capital area career center

module: 7501 05 002 1 7501 05 002 3 date: MAY 1977 level: I

skill title: CARBURETOR OVERHAUL - DIAPHRAGM TYPE

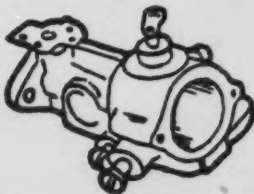
developed & written by: HARRY WRIGHT

visuals by: DAVE WEHRWE 259

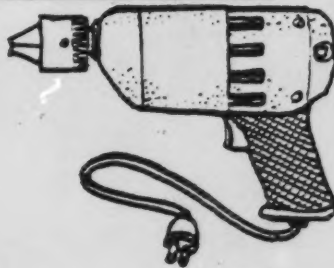


WORD GUIDEGUIDELINES - RULESPERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO RE-BUILD A DIAPHRAGM TYPE CARBURETOR.

AND IN ORDER TO DO THIS YOU WILL NEED:

DIAPHRAGM TYPE  
CARBURETOR



DRILL



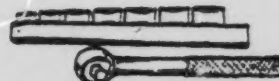
SERVICE MANUAL FOR  
KIND OF CARBURETOR ON  
WHICH YOU ARE WORKING



EPOXY



SAFETY GLASSES



SOCKET SET



SCREWDRIVER



CLEANING FLUID



SOLVENT

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE ALL YOUR EQUIPMENT.
2. YOU HAVE RE-BUILT THE CARBURETOR TO SERVICE MANUAL GUIDELINES. THIS WILL MEAN THAT WHEN THE THROTTLE IS OPENED, IT CAN BE SET TO IDLE AND MOVE TO TOP SPEED SMOOTHLY.

"TURN THE PAGE"

WORD GUIDE

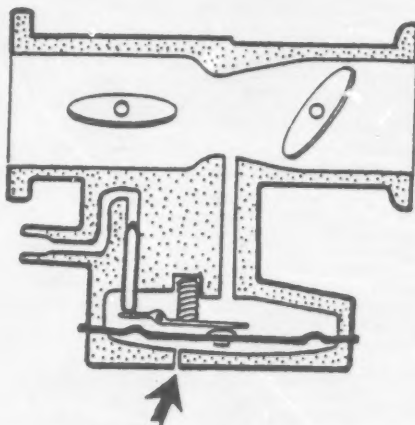
DIAPHRAGM - A THIN, EASY-TO-MOVE  
DISK

GRAVITY - PULLED DOWN BY ITS OWN  
WEIGHT

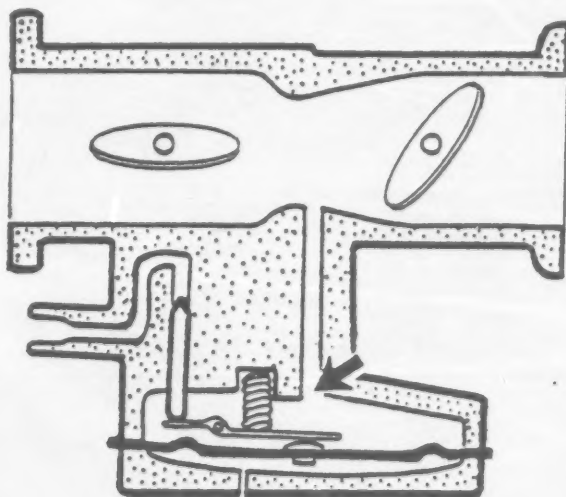
VACUUM - SUCTION CAUSED BY MOVING  
AIR

INFORMATION

IN A DIAPHRAGM TYPE CARBURETOR, FUEL GETS TO THE CARBURETOR BY GRAVITY OR THROUGH A FUEL PUMP. THROUGH A VENT HOLE, AIR PUSHES ON THE LOW SIDE OF THE DIAPHRAGM.



WHEN THE ENGINE RUNS, THERE IS A VACUUM THROUGH THE NOZZLE ABOVE THE DIAPHRAGM.



"TURN THE PAGE"

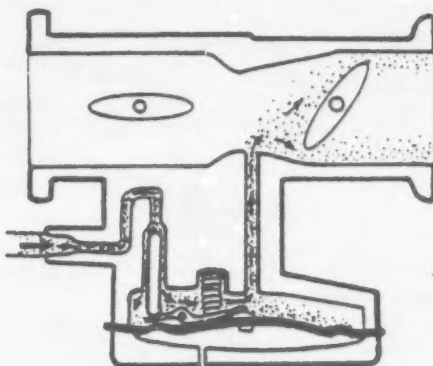
WORD GUIDE

INLET VALVE - A FUEL-OPENING IN  
THE CARBURETOR

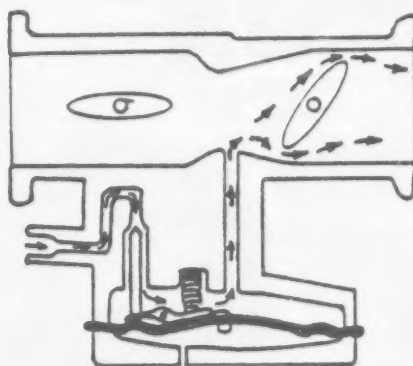
THROTTLE PLATE - A THIN, ROUND  
PIECE OF METAL IN THE AIR  
HORN

INFORMATION

THE PUSHING AIR ON THE LOW SIDE OF THE DIAPHRAGM MOVES UP THE DIAPHRAGM AND THE INLET VALVE. THE DIAPHRAGM IS OPEN SO FUEL CAN GO INTO THE CARBURETOR.



WHEN THE ENGINE RUNS, VACUUM DRAWS THE FUEL THROUGH THE OPENING INTO THE ENGINE. THE THROTTLE PLATE MUST BE AT LEAST PARTLY OPENED.



"TURN THE PAGE"

WORD GUIDE

VENTURI - A SHORT TUBE THROUGH  
WHICH FUEL FLOWS



RICH - LOW IN OXYGEN, HIGH IN FUEL.

CHOKE - CONTROLS THE FLOW OF FUEL

LEAN - HIGH IN OXYGEN, LOW IN FUEL.

INFORMATION

WHEN THE ENGINE IS COLD, THE CHOKE IS CLOSED AND LESS AIR GETS INTO THE VENTURI. THIS MAKES THE AIR MIXTURE RICH. WHEN THE ENGINE WARMS UP, THE CHOKE IS OPEN. THIS LETS MORE AIR INTO THE VENTURI SO THE AIR FUEL MIXTURE IS THIN.

THERE ARE MANY KINDS OF DIAPHRAGM TYPE CARBURETORS. IN THIS MODULE, WE WILL USE A TECUMSEH CARBURETOR.

"TURN THE PAGE"

JOB STEPSREAD:

1. TAKE ALL EQUIPMENT TO  
YOUR WORK AREA.



2. PUT ON YOUR SAFETY GLASSES.



3. TAKE OFF THE AIR FILTER.



4. WITH AN OPEN-ENDED WRENCH,  
TAKE OFF FUEL LINE FROM THE  
CARBURETOR.

LOOK:

"TURN THE PAGE"



WORD GUIDEWRINKLES - FOLDSFLAKE-OFF - SMALL PIECES THAT HAVE  
BROKEN OFF FROM A PARTREMOVE - TAKE OFFREPLACE - CHANGE OR PUT BACKJOB STEPSREAD:

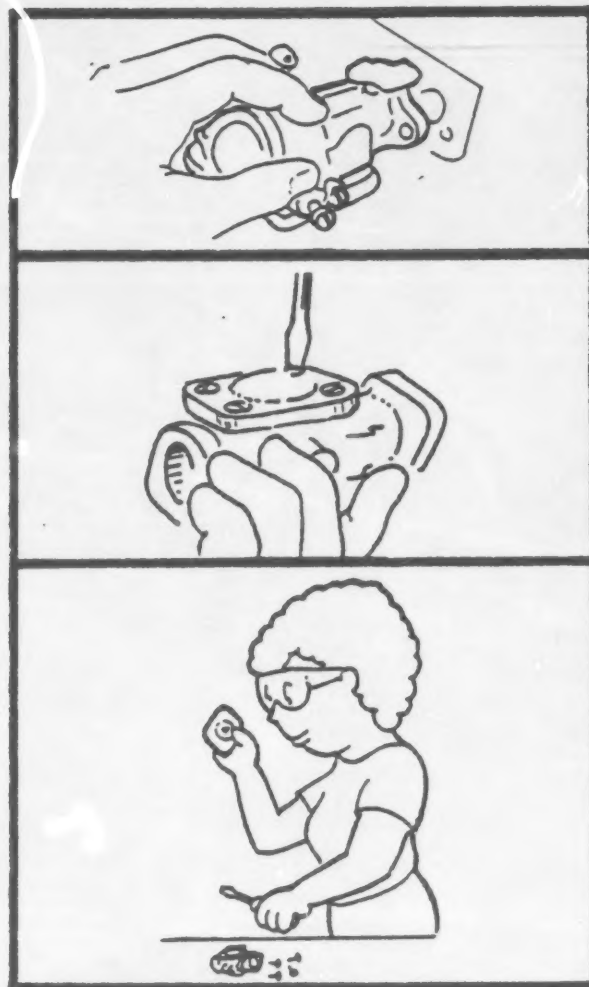
5. WITH YOUR SOCKET SET, REMOVE  
THE CARBURETOR FROM THE ENGINE.



6. WITH YOUR SCREWDRIVER,  
REMOVE THE DIAPHRAGM COVER  
SCREWS.



7. CHECK THE DIAPHRAGM FOR  
FOLDS, FLAKE-OFF AND ODD SHAPES,  
BENDS, ETC.

LOOK:

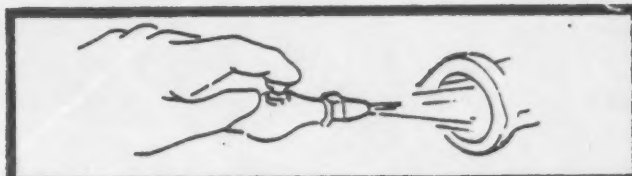
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. PUT ON YOUR SAFETY GLASSES.
3. TAKEN OFF AIR FILTER, CARBURETOR FUEL LINE, CARBURETOR AND DIAPHRAGM COVER SCREWS.
4. CHECKED THE DIAPHRAGM FOR FOLDS, FLAKE-OFF AND ODD SHAPES.

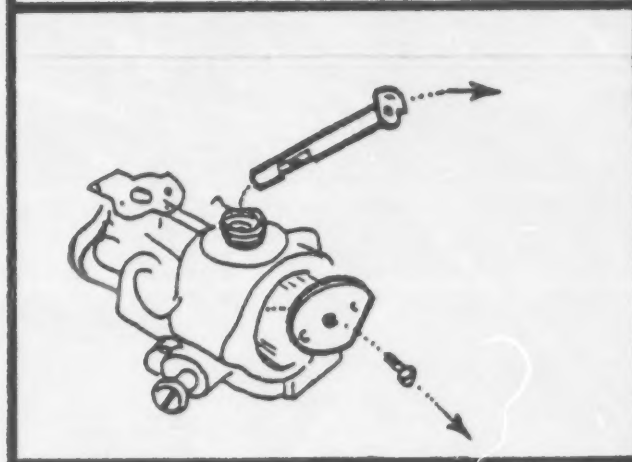
"TURN THE PAGE"

WORD GUIDECOMPRESSED AIR - AIR UNDER PRESSUREJOB STEPSREAD:

8. CLEAN HIGH, MIDDLE AND LOW SPEED AIRWAYS WITH COMPRESSED AIR.

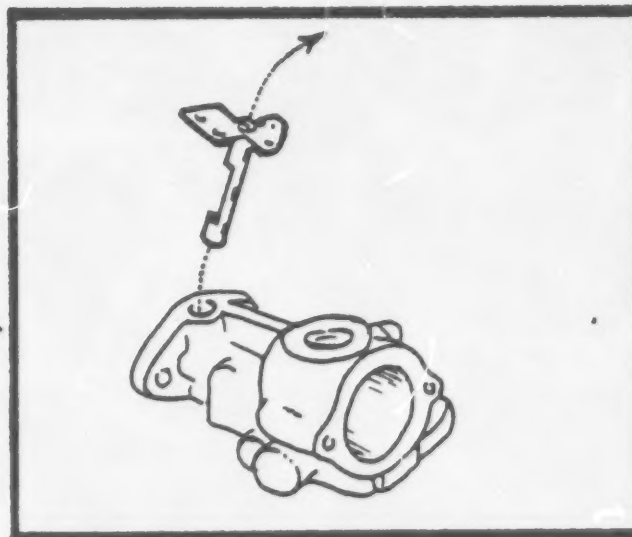
LOOK:

9. REMOVE THE CHOKE SHAFT AND PLATE.



10. CLEAN ALL TOP PARTS WITH CLEANING SOLVENT.

11. REMOVE THE THROTTLE SHAFT AND CLEAN IT WITH CLEANING SOLVENT.



"TURN THE PAGE"

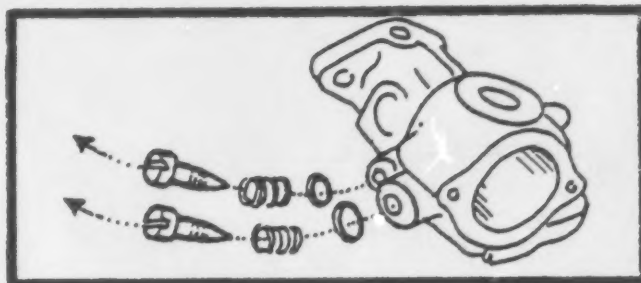
WORD GUIDEBUSHINGS - LININGJOB STEPSREAD:LOOK:

12. CHECK THE THROTTLE SHAFT AND BUSHINGS FOR WEAR.

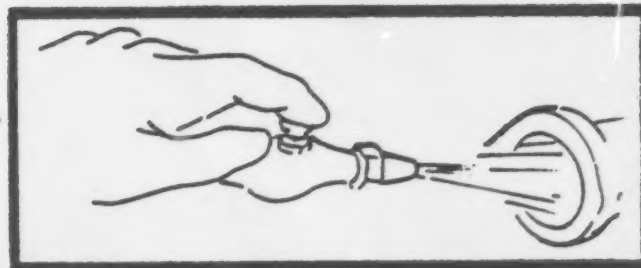
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CLEANED AIRWAYS WITH COMPRESSED AIR.
2. REMOVED THE CHOKE SHAFT AND THROTTLE SHAFT RIGHT.
3. CLEANED BOTH THE SHAFTS IN SOLVENT.
4. CHECKED THE THROTTLE SHAFT AND BUSHINGS FOR WEAR.

13. USING A SCREWDRIVER, TAKE OUT THE MAIN AND IDLE FUEL NEEDLE.



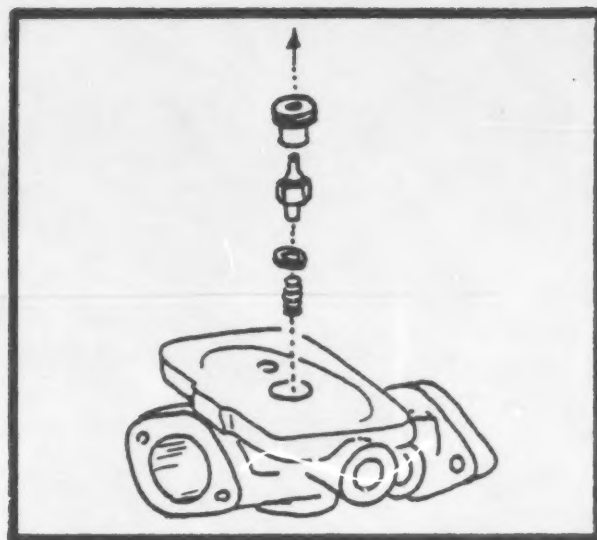
14. USING COMPRESSED AIR, CLEAN THE JETS.



"TURN THE PAGE"

JOB STEPSREAD:

15. REMOVE THE INLET LEVER.

LOOK:

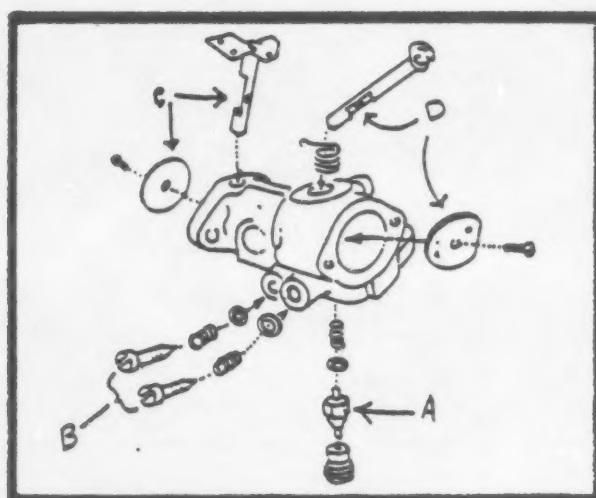
16. CLEAN THESE PARTS WITH SOLVENT.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE MAIN AND IDLE FUEL NEEDLE.
2. CLEANED THE JETS WITH COMPRESSED AIR.
3. REMOVED THE INLET LEVER NEEDLE AND HINGE PIN CORRECTLY.
4. CLEANED THE PARTS.

17. PUT THE PARTS BACK IN THIS WAY:

- A. INLET LEVER, NEEDLE AND HINGE PIN
- B. MAIN AND IDLE FUEL NEEDLE
- C. THROTTLE SHAFT
- D. CHOKE SHAFT AND PLATE



"TURN THE PAGE"

WORD GUIDE

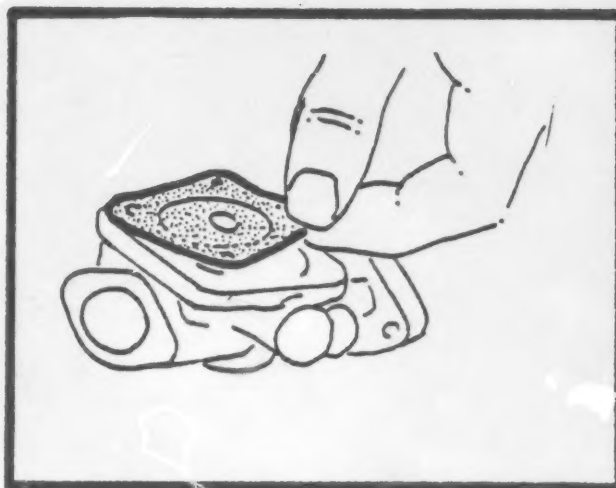
ADJUST - TO MAKE CORRECT; TO  
SET PROPERLY

CLOCKWISE - TO THE RIGHT

COUNTERCLOCKWISE - TO THE LEFT

JOB STEPSREAD:

18. PUT IN THE DIAPHRAGM. IF  
THE OLD ONE IS WORN OUT, USE A  
NEW DIAPHRAGM.

LOOK:

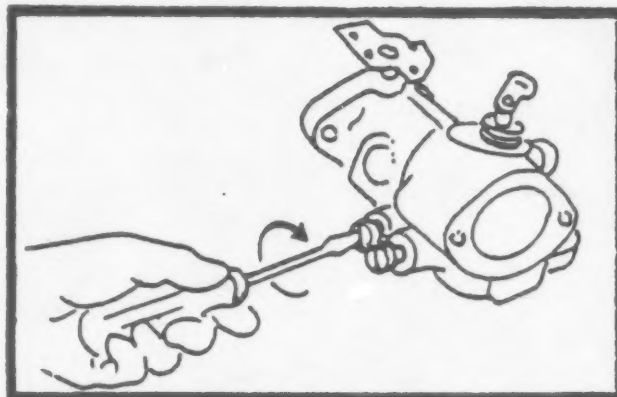
19. USING A SCREWDRIVER, SCREW  
ON THE DIAPHRAGM COVER. MAKE  
SURE THE SCREWS ARE NOT TOO  
TIGHT, BUT TIGHT ENOUGH.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PUT BACK IN ALL PARTS RIGHT.
2. MADE SCREWS TIGHT ON DIAPHRAGM COVER.

20. SET THE IDLE FUEL NEEDLE  
BY TURNING IT TO THE RIGHT ALL  
THE WAY.

THEN, TURN IT TO THE LEFT,  
3/4 TURN.



"TURN THE PAGE"



JOB STEPSCONNECT - ATTACHREAD:LOOK:

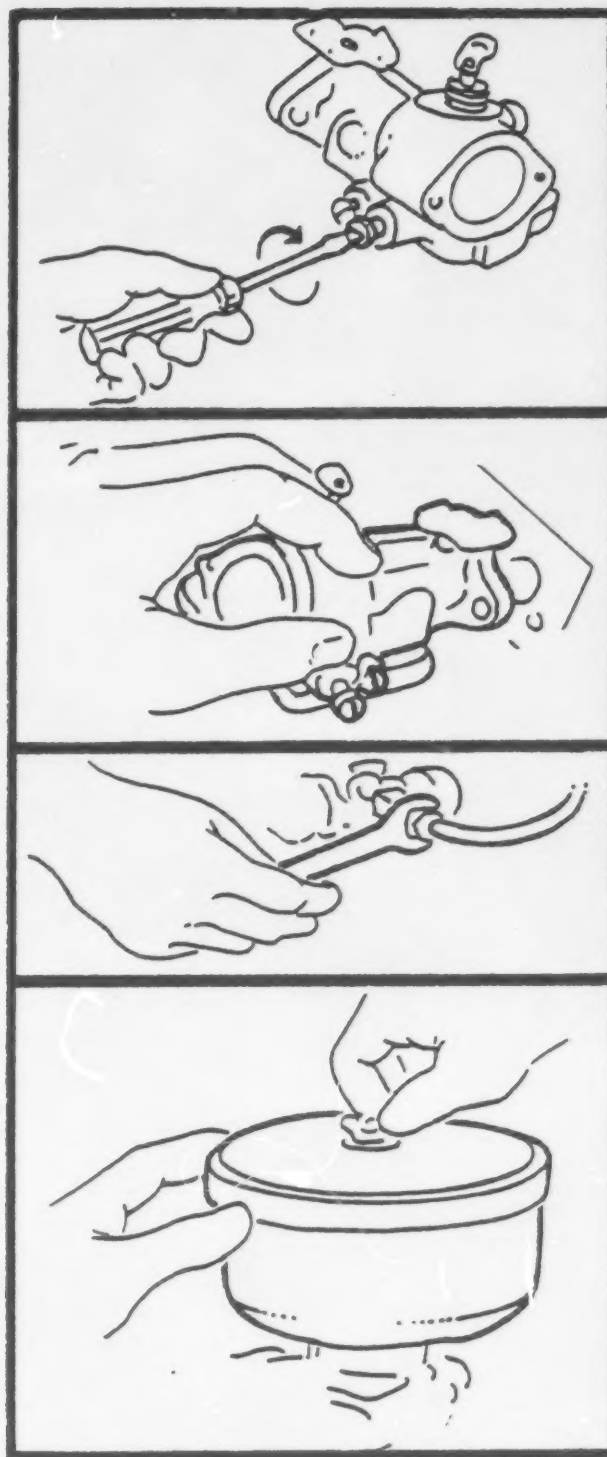
21. TO SET THE MAIN FUEL NEEDLE, USE A SCREWDRIVER TO TURN IT TO THE RIGHT ALL THE WAY.

THEN, TURN IT TO THE LEFT 1 TURN.

22. WITH YOUR SOCKET SET, PUT THE CARBURETOR BACK ONTO THE ENGINE.

23. CONNECT THE FUEL LINE TO THE CARBURETOR.

24. PUT ON THE AIR FILTER.



"TURN THE PAGE"

JOB STEPSREAD:

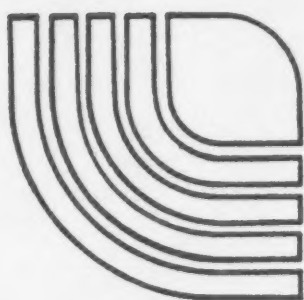
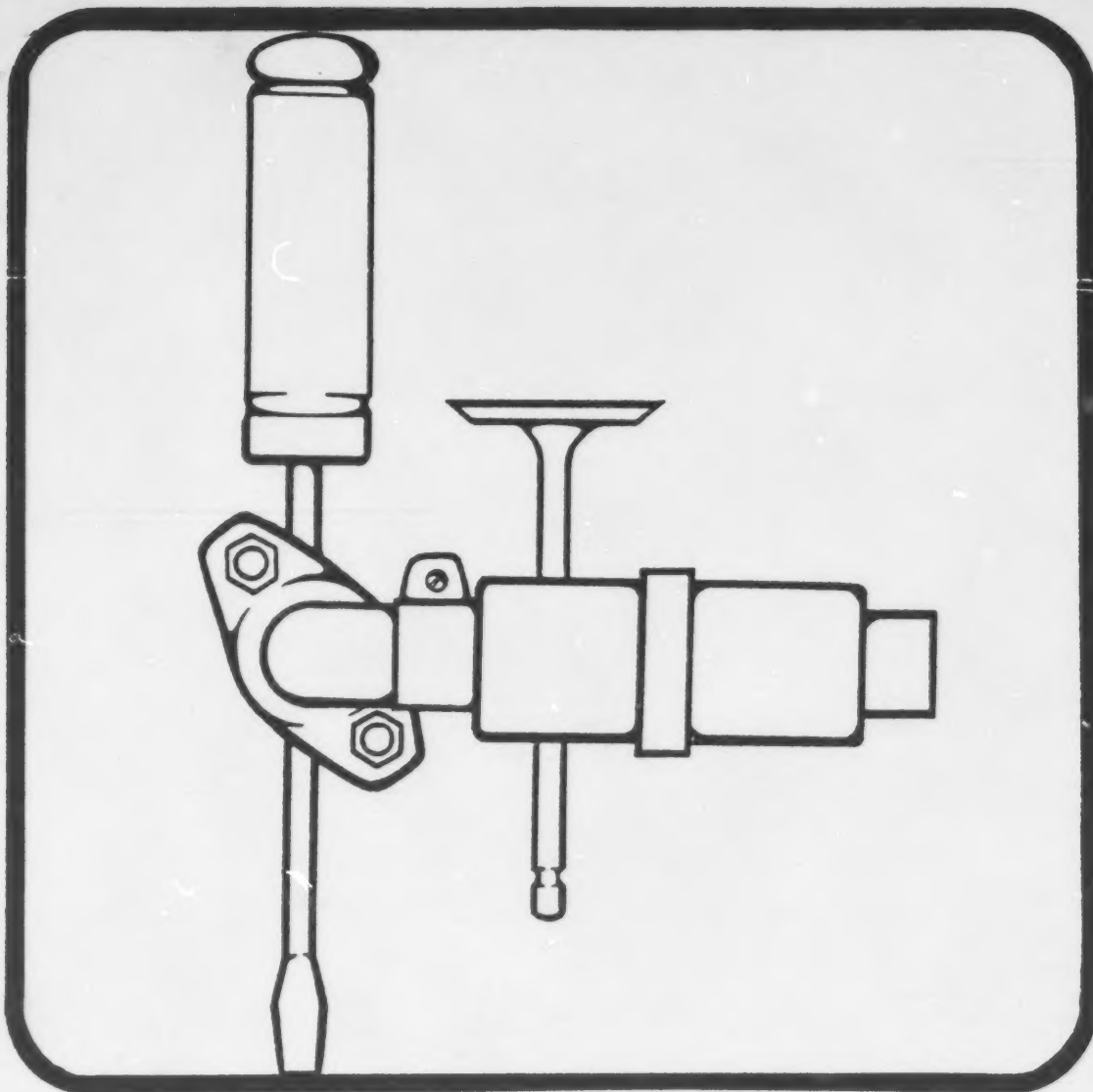
25. START THE ENGINE. IF THE ENGINE WILL NOT START, SEE THE INSTRUCTOR.

LOOK:

26. SET THE CARBURETOR USING THE STEPS IN MODULES:  
7501 05 007 1/7501 05 007 3.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. SET THE IDLE FUEL NEEDLE AND MAIN FUEL NEEDLE RIGHT.
2. PUT THE CARBURETOR BACK ONTO THE ENGINE.
3. CONNECTED THE FUEL LINE TO THE CARBURETOR.
4. PUT ON THE AIR FILTER.
5. STARTED THE ENGINE AND SET THE CARBURETOR USING STEPS IN MODS 7501 05 007 1/7501 05 007 3.



## small engine repair

unit: CARBURETORS

capital area career center

module: 7501 05 003 1 7501 05 003 3 date: MAY 1978 level: I

skill title: CARBURETOR OVERHAUL (SLIDING-VALVE TYPE)

developed & written by: JACK HELDER AND JIM PITTS

visuals by: DAVE WEHRWEIN

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

HOW TO OVERHAUL A SLIDING VALVE TYPE CARBURETOR USED ON  
2-CYCLE ENGINES.

AND IN ORDER TO DO THIS YOU WILL NEED:

A SLIDING VALVE TYPE CARBURETOR

HAND TOOLS

SERVICE MANUAL FOR YOUR CARBURETOR

WE WILL KNOW YOU CAN DO IT WHEN:

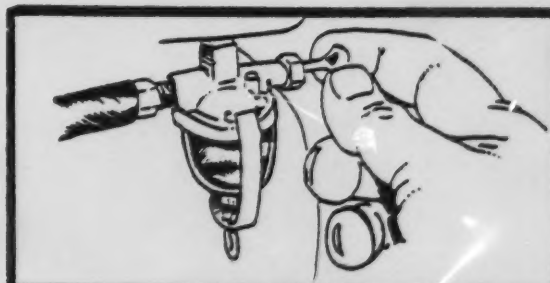
1. YOU HAVE ALL EQUIPMENT.
2. YOU HAVE OVERHAULED THE CARBURETOR.
3. THE CARBURETOR WORKS WELL AND THERE ARE NO FUEL LEAKS.

JOB STEPS

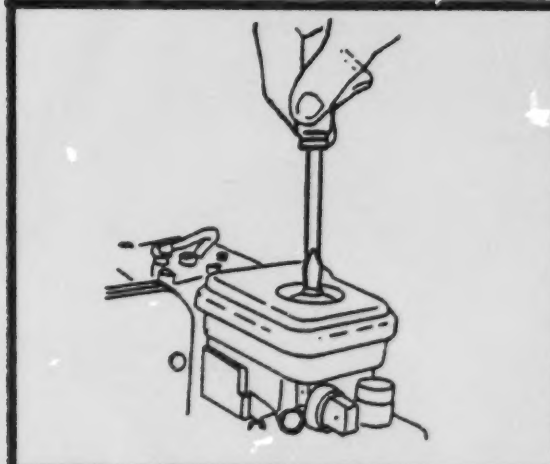
READ:

LOOK:

1. CLOSE GAS LINE.



2. REMOVE AIR CLEANER.



3. REMOVE GAS LINES.



4. REMOVE CARBURETOR FROM ENGINE.



"TURN THE PAGE"



JOB STEPS

READ:

LOOK:

CHECK: HAVE YOUR INSTRUCTOR CHECK THAT YOU HAVE:

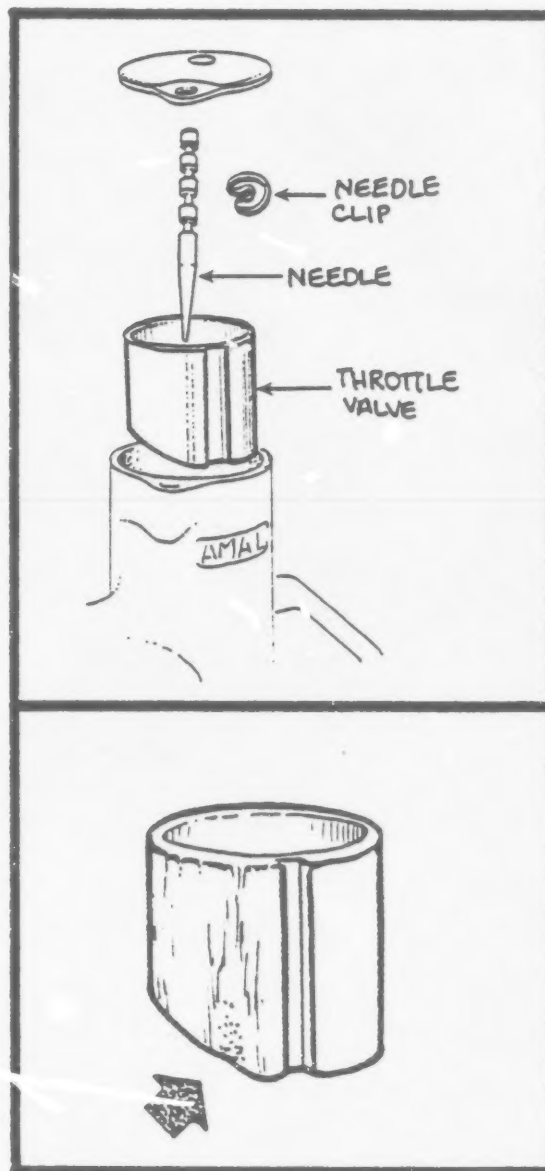
1. TURNED OFF GAS.
2. REMOVED AIR-CLEANER
3. REMOVED CARBURETOR FROM ENGINE.

5. REMOVE MIXING CHAMBER CAP  
HOLDER AND PULL FROM CARBURETOR.



ALSO REMOVE:

THROTTLE VALVE  
NEEDLES  
NEEDLE CLIPS



6. CHECK THROTTLE VALVE SLIDE  
FOR SCRATCHES.



NOTE: IF THERE ARE SCRATCHES,  
SHOW TO YOUR INSTRUCTOR.

JOB STEPS

READ:

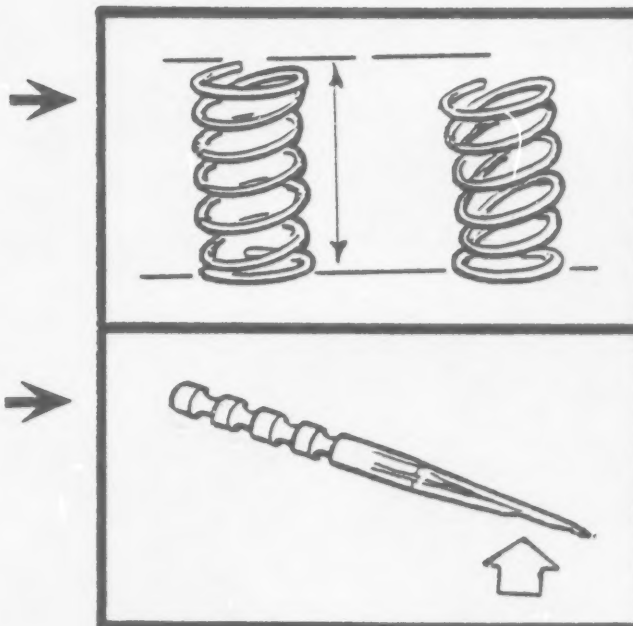
7. BE SURE THROTTLE RETURN SPRING IS "SPRINGY".

NOTE: IF SPRING SEEMS WEAK, SHOW TO YOUR INSTRUCTOR.

8. CHECK NEEDLE JET FOR WEAR OR SCRATCHES. THE THIN END SHOULD BE SMOOTH.

NOTE: IF NOT SMOOTH, SHOW TO YOUR INSTRUCTOR.

LOOK:



CHECK: SHOW YOUR INSTRUCTOR:

1. THE NEEDLE VALVE SLIDE.
2. THE THROTTLE RETURN SPRING.
3. THE NEEDLE JET.

9. REMOVE THE MAIN JET HOLDER.



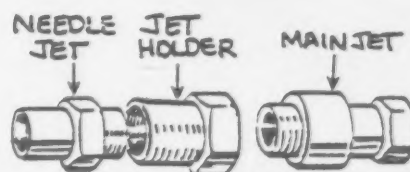
"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

10. REMOVE THE MAIN JET FROM ITS HOLDER.

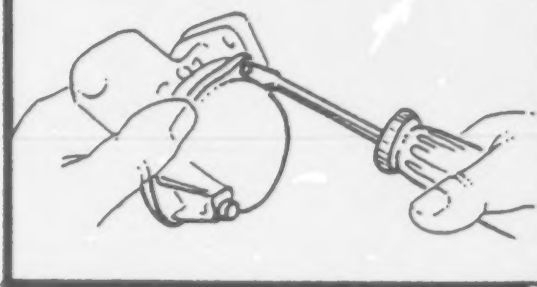


11. BLOW OUT THE JETS WITH AN AIR HOSE.



NOTE: NEVER USE WIRE OR A TOOL TO CLEAN JETS.

12. REMOVE BOWL COVER SCREWS.



13. TAKE BOWL OFF.

CHECK: HAVE YOUR INSTRUCTOR CHECK THAT YOU HAVE:

1. TAKEN APART THE MAIN JET AND HOLDER.
2. BLOWN OUT THE JETS.
3. REMOVED THE BOWL COVER.

## READ:

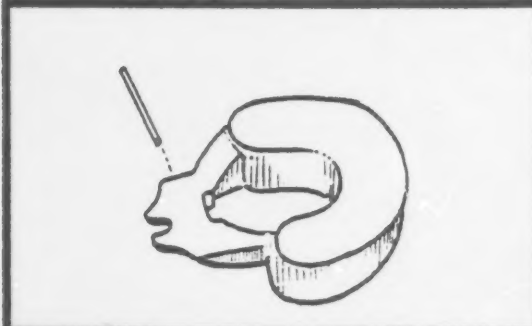
JOB STEPS

## LOOK:

14. ASK YOUR INSTRUCTOR TO CHECK IF FLOAT IS LEAKING. IF IT IS, GO TO STEP 15. IF IT IS NOT LEAKING, GO TO STEP 16.

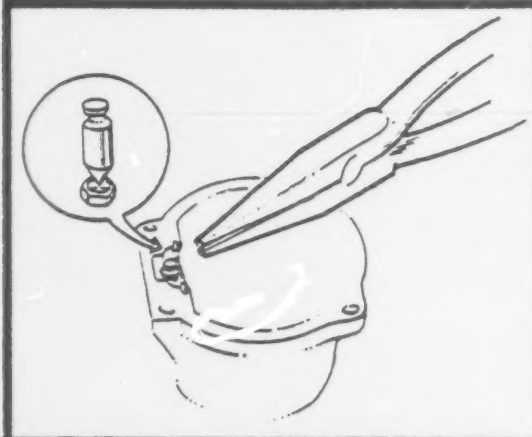


15. IF FLOAT LEAKS, REMOVE FLOAT LEVER PIN AND FLOAT LEVER.

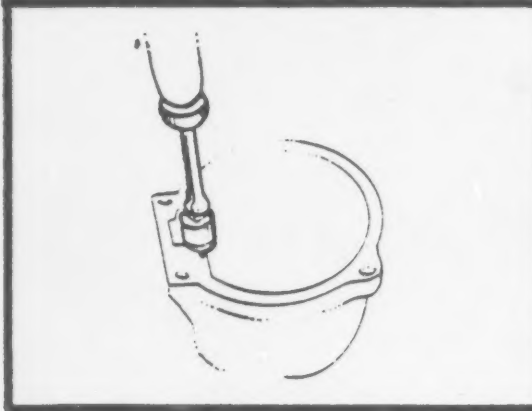


NOTE: ASK YOUR INSTRUCTOR IF YOU SHOULD REPLACE FLOAT.

16. REMOVE FLOAT NEEDLE.



17. REMOVE FLOAT NEEDLE SEAT.

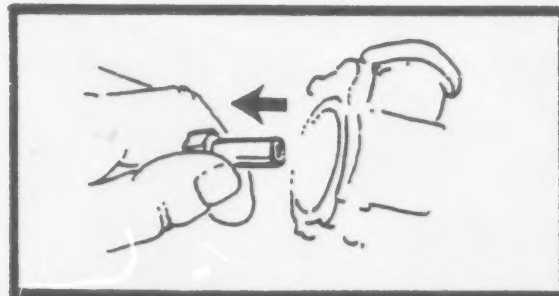


JOB STEPS

READ:

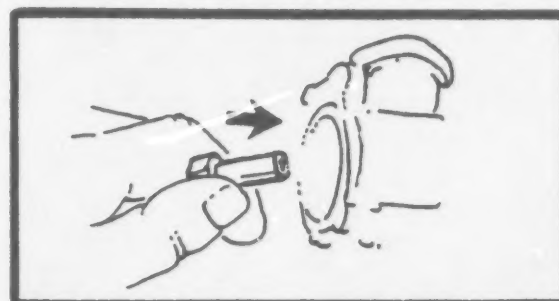
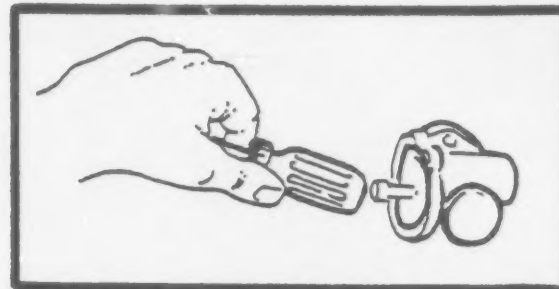
18. REMOVE NEEDLE JET HOLDER.

LOOK:

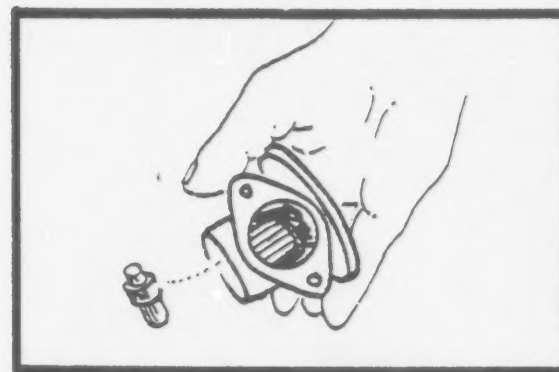


NOTE: BE SURE TO KEEP ALL  
SMALL PARTS IN ONE  
PLACE. DO NOT LOSE  
THEM.

CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK THIS FAR.

19. SCREW THE NEEDLE JET  
HOLDER BACK IN WITHOUT THE  
WASHER.20. TAP THE HOLDER WITH A  
SCREWDRIVER TO LOOSEN THE  
NEEDLE JET.

21. REMOVE THE NEEDLE JET.



"TURN THE PAGE"



JOB STEPS

READ:

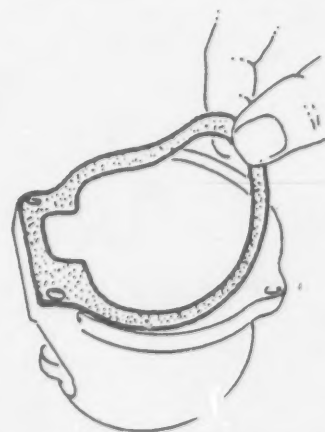
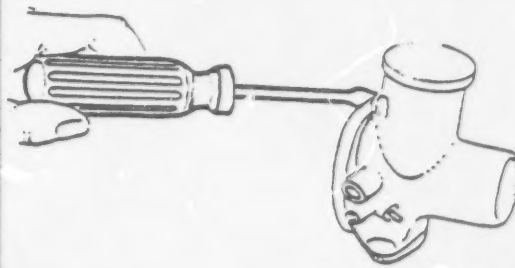
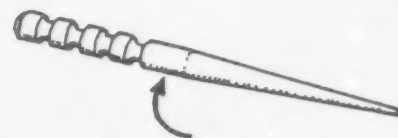
22. NOTICE THAT THE SIZE OF THE NEEDLE JET IS STAMPED ON THE SIDE.

23. UNSCREW THE PILOT JET.

24. NOTICE THAT THE SIZE OF THIS JET IS ALSO STAMPED ON ITS SIDE.

25. REMOVE THE BOWL FLOAT GASKET.

LOOK:



"TURN THE PAGE"

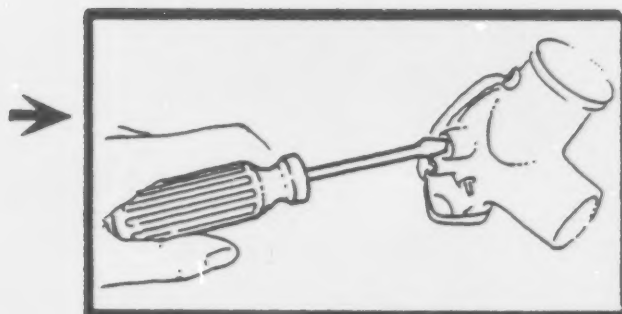
JOB STEPS

READ:

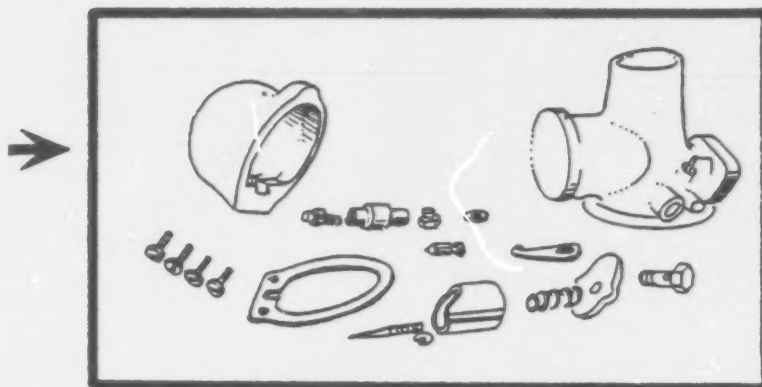
LOOK:

26. DIP METAL PARTS OF  
CARBURETOR IN CLEANER.

27. REMOVE IDLE AIR SCREW.



28. DO YOU HAVE ALL PARTS?  
CHECK TO BE SURE.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE  
REMOVED ALL PARTS AND THAT YOU HAVE ALL OF  
THEM.

"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

29. GET ANY REPLACEMENT  
PARTS YOU WILL NEED:

- 1) FLOAT?
- 2) BOWL GASKET?
- 3) ANY NEEDLES?
- 4) OTHERS?

CHECK: ASK YOUR INSTRUCTOR IF ANY PARTS NEED TO BE  
REPLACED.

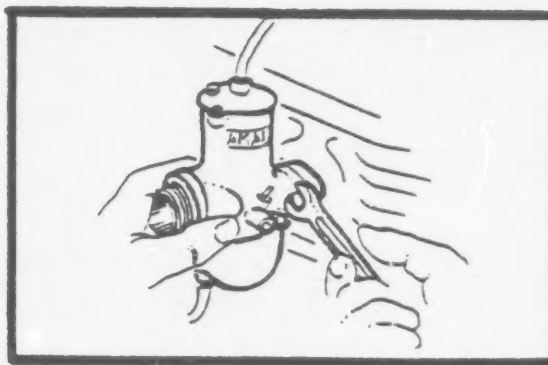
30. NOW, STARTING WITH STEP  
27, DO ALL THE STEPS BACKWARDS  
UNTIL THE CARBURETOR IS BACK  
TOGETHER.

NOTE: WHEN PUTTING NEEDLE  
VALVE BACK IN (STEP 5),  
BE SURE IT IS SET TO  
SPECIFICATIONS. ASK  
YOUR INSTRUCTOR.



CHECK: WHEN CARBURETOR IS BACK TOGETHER, ASK YOUR  
INSTRUCTOR TO CHECK YOUR WORK.

31. REPLACE CARBURETOR ON  
ENGINE.



"TURN THE PAGE"

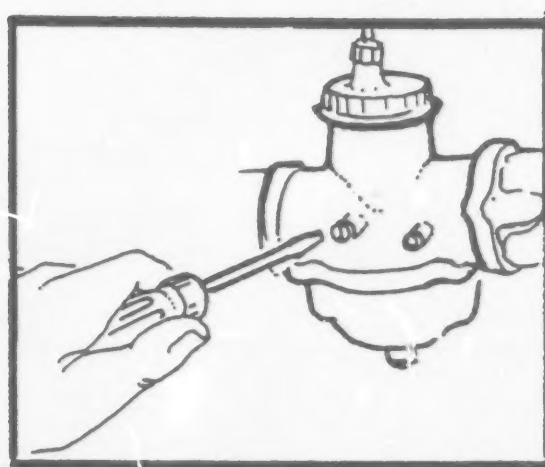
JOB STEPS

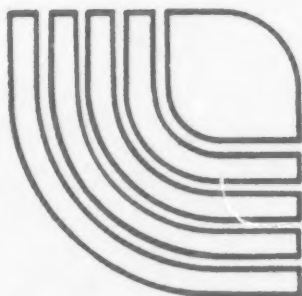
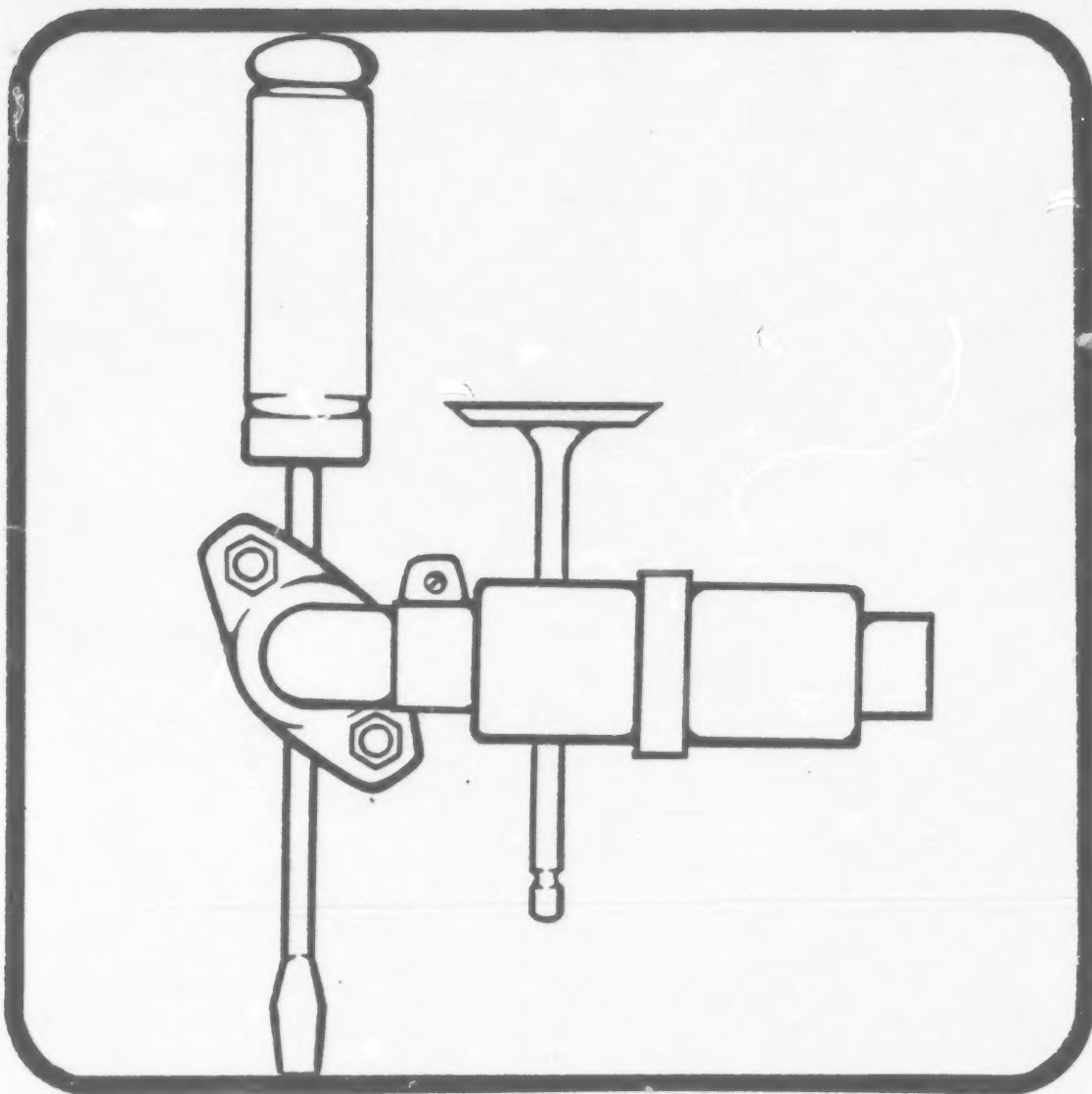
READ:

LOOK:

32. START ENGINE AND LET IT  
WARM UP.

33. SET IDLE ADJUSTMENTS.  
ASK YOUR INSTRUCTOR TO HELP.





## small engine repair

unit: CARBURETOR

capital area career center

module: 7501 05 004 1 7501 05 004 3 date: JULY 1977 level: I

skill title: CARBURETOR OVERHAUL -- SUCTION TYPE

developed & written by: JACK HELDER

visuals by: DAVE WEHRWEIN & BRUCE BENNETT

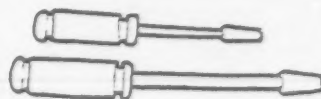


PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REMOVE, TAKE APART, REBUILD AND REPLACE A SUCTION-TYPE CARBURETOR USED ON A FOUR CYCLE ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:

A SUCTION CARBURETOR



A SCREWDRIVER SET



A SOCKET SET



CARBURETOR CLEANER



OLEUM



SAFETY GLASSES

SERVICE MANUAL FOR KIND  
OF CARBURETOR ON WHICH  
YOU ARE WORKING

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED ALL YOUR EQUIPMENT.
2. YOU HAVE REMOVED THE CARBURETOR, TAKEN IT APART, REBUILT IT, AND PUT IT BACK ON THE ENGINE.
3. YOU ARE ABLE TO START THE ENGINE AND HAVE IT RUNNING SMOOTHLY.

"TURN THE PAGE"

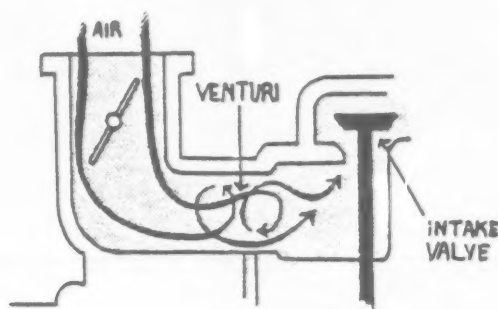
WORD GUIDE

VACUUM - AIR PULLING FORCE.

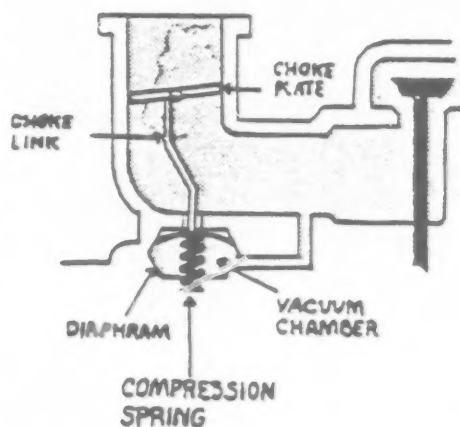
VENTURI - PART OF CARBURETOR THROAT THAT NARROWS DOWN TO A SMALLER DIAMETER. CAUSES A VACUUM THAT SUCKS FUEL FROM NEEDLE VALVE INTO THE STREAM OF AIR.

INFORMATION

THE SUCTION CARBURETOR IS THE SIMPLEST KIND. THERE IS ONLY ONE FUEL MIXTURE ADJUSTMENT. AIR IS DRAWN INTO THE AIR HORN TO THE THROAT. VACUUM FROM THE ENGINE DRAWS AIR THROUGH THE VENTURI WHERE IT IS MIXED WITH FUEL BEFORE GOING INTO THE ENGINE'S INTAKE VALVE.



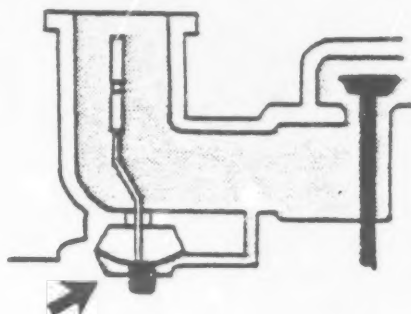
A DIAPHRAGM UNDER THE CARBURETOR IS CONNECTED TO THE CHOKE SHAFT BY A LINK. A SPRING HOLDS THE DIAPHRAGM. THE CHOKE VALVE CLOSED WHEN THE ENGINE IS COLD.



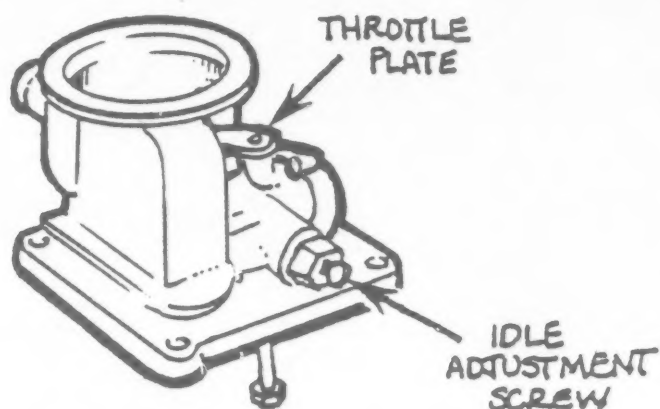
"TURN THE PAGE"

INFORMATION

WHEN THE ENGINE IS STARTED, A VACUUM IS CREATED DURING THE INTAKE STROKE THAT PULLS DOWN THE DIAPHRAGM. THIS OPENS THE CHOKE.



THE SPEED OF THE ENGINE IS CONTROLLED BY THE POSITION OF THE THROTTLE PLATE. THIS REGULATES THE AMOUNT OF AIR-FUEL MIXTURE GOING INTO THE ENGINE.



THE CARBURETOR WE ARE GOING TO OVERHAUL IS FOR A BRIGGS AND STRATTON ENGINE.

"TURN THE PAGE"

JOB STEPS

## READ:

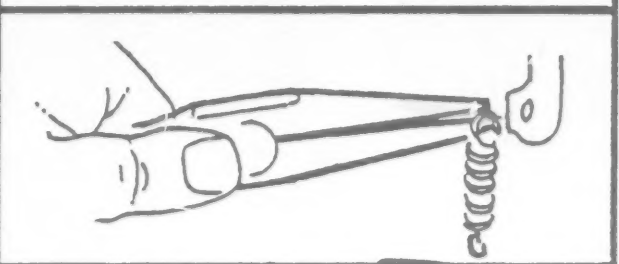
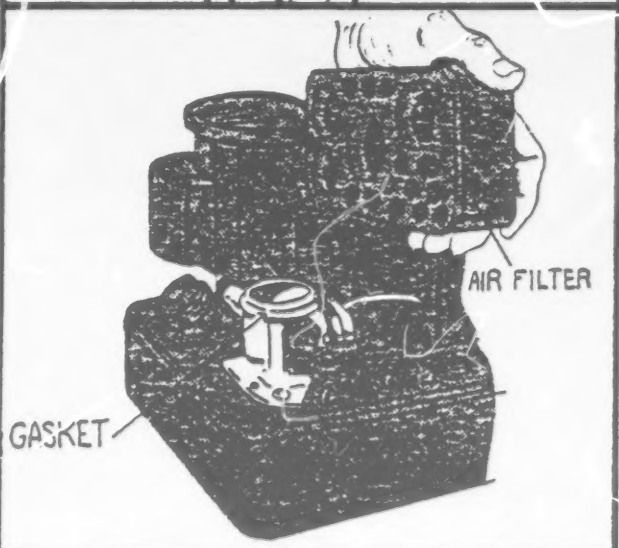
1. GET ALL EQUIPMENT AND TAKE IT TO YOUR WORK AREA.

2. CHECK THE SERVICE MANUAL FOR ANY SPECIAL INFORMATION ABOUT YOUR CARBURETOR (SPECIAL TOOLS NEEDED OR PARTS THAT SHOULD NOT BE REMOVED).

3. TAKE OFF AIR FILTER. CHECK THE GASKET. WEAR YOUR SAFETY GLASSES.

4. REMOVE THROTTLE AND GOVERNOR LINKAGES.

## LOOK:

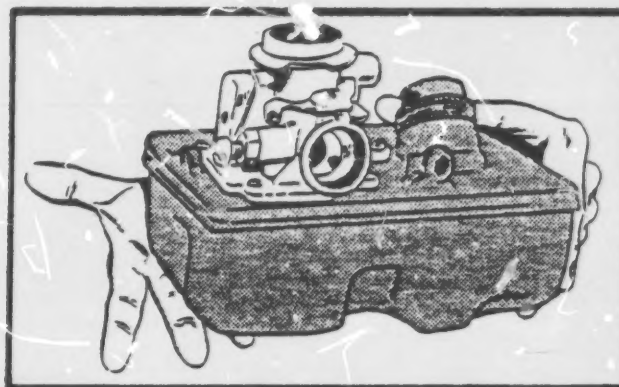


JOB STEPS

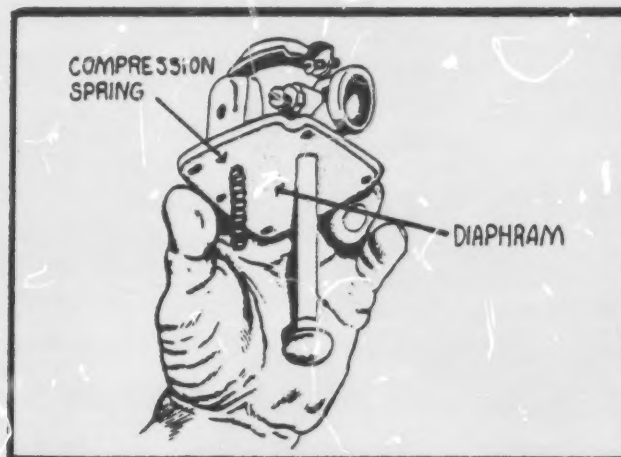
READ:

5. USING A SCREWDRIVER AND SOCKET SET, TAKE THE CARBURETOR AND FUEL TANK OFF OF THE ENGINE.

LOOK:



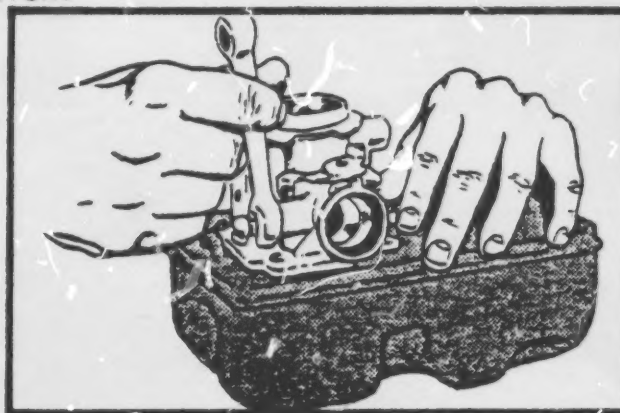
6. NOW TAKE THE CARBURETOR OFF THE FUEL TANK. DO NOT TEAR THE DIAPHRAGM OR LOSE THE SPRING.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL NEEDED EQUIPMENT.
2. CORRECT SERVICE MANUAL.
3. REMOVED THE CARBURETOR.

7. USE A WRENCH TO TAKE OFF THE NEEDLE VALVE ASSEMBLY.



"TURN THE PAGE"



WORD GUIDE

BUSHINGS - A LINING, USUALLY METAL, THAT CUTS DOWN ENGINE WEAR.

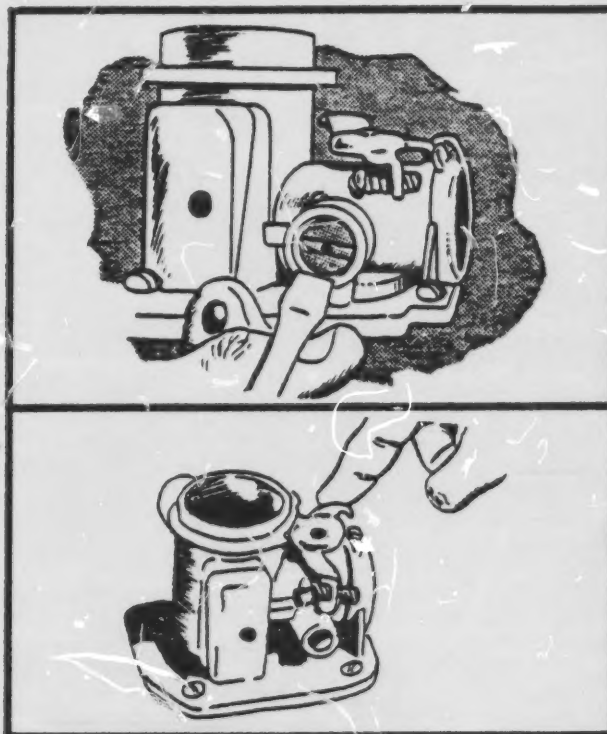
JOB STEPS

READ:

8. UNSCREW THE FUEL NOZZLE.

9. CHECK THE THROTTLE PLATE AND BUSHINGS. REPLACE WORN OR BROKEN PARTS.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OFF THE NEEDLE VALVE ASSEMBLY.
2. UNSCREWED THE FUEL NOZZLE.
3. CHECKED THE THROTTLE PLATE AND BUSHINGS.

10. PUT ALL METAL PARTS ONLY IN CARBURETOR CLEANER. SOAK FOR 20 MINUTES.

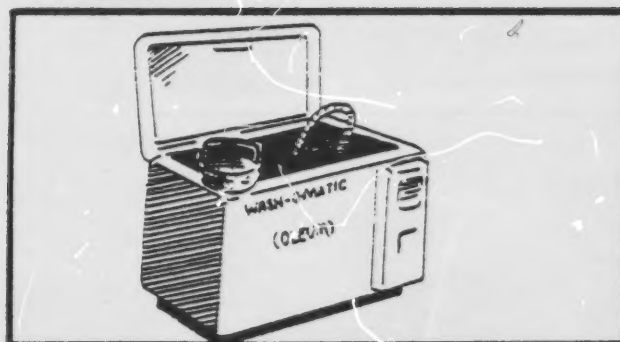
\*\*\*\*\*  
 CAUTION: BE CAREFUL! THE  
 CLEANER CAN BURN YOUR  
 EYES AND SKIN. IF YOU  
 DO BURN YOURSELF, SEE  
 YOUR INSTRUCTOR FAST.  
 \*\*\*\*\*



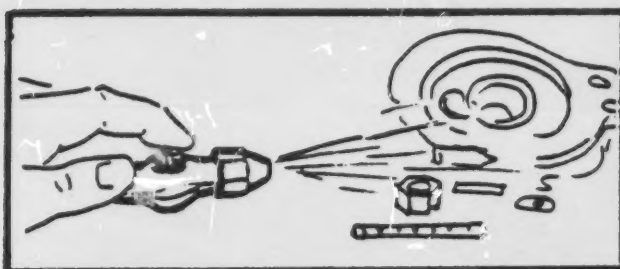
JOB STEPS

READ:

11. REMOVE PARTS FROM CLEANER AND RINSE IN OLEUM.



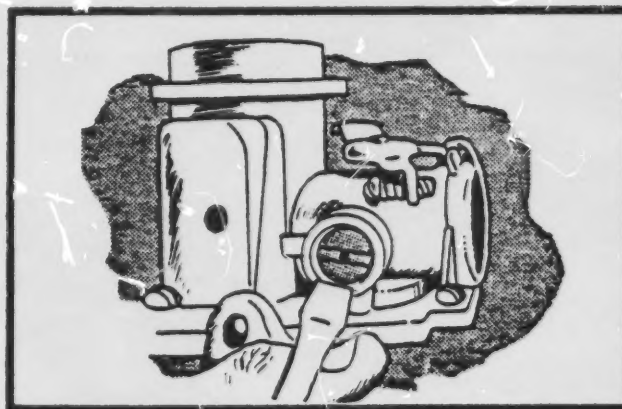
12. BLOW DRY ALL PARTS WITH COMPRESSED AIR.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. SOAKED METAL PARTS IN CLEANER FOR 20 MINUTES.
2. RINSED THEM IN OLEUM.
3. BLOWN THEM ALL DRY.

13. WITH YOUR SCREWDRIVER, PUT THE NOZZLE BACK IN ITS PROPER PLACE.





COUNTER-CLOCKWISE - TO THE LEFT.

JOB STEPS

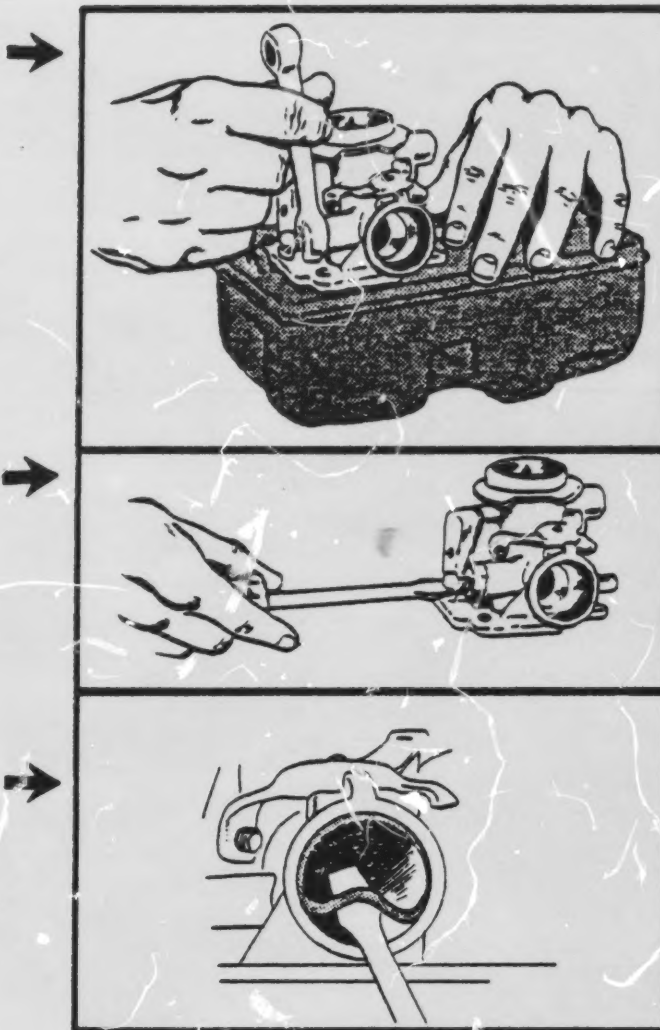
READ:

14. TIGHTEN ON THE NEEDLE VALVE ASSEMBLY WITH A WRENCH.

15. TURN THE IDLE NEEDLE ALL THE WAY IN AND THEN TURN IT BACK COUNTER-CLOCKWISE 1 1/2 TURNS.

16. CHECK O-RING WHERE THE CARBURETOR CONNECTS TO ENGINE, REPLACE IF NECESSARY.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REPLACED NOZZLE.
2. TIGHTENED ON THE NEEDLE VALVE ASSEMBLY.
3. TURNED IN AND TURNED OUT IDLE NEEDLE AS TOLD IN STEP 15.
4. CHECKED AND INSTALLED THE O-RING.

JOB STEPS

READ:

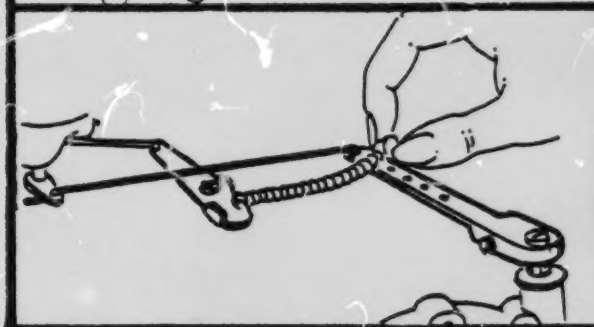
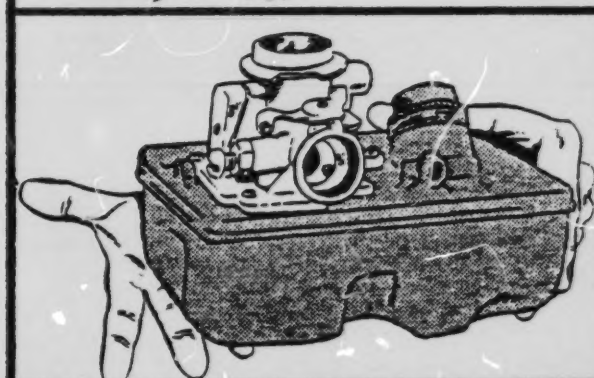
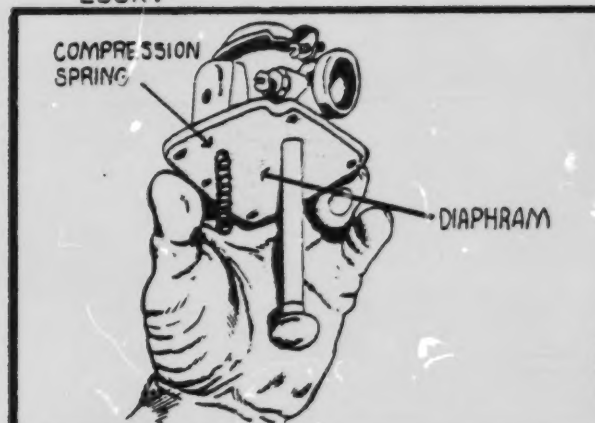
17. PUT THE CARBURETOR BACK ON THE FUEL TANK.

NOTE: CHECK TO BE SURE THERE ARE NO TEARS IN THE DIAPHRAGM AND THAT THE COMPRESSION SPRING IS IN PLACE.

18. PUT THE FUEL TANK AND CARBURETOR BACK ON THE ENGINE.

19. PUT THE THROTTLE CONTROL LINK AND GOVERNOR CONTROL LINK BACK ON.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CORRECTLY PUT TOGETHER THE CARBURETOR.
2. TIGHTENED THE CARBURETOR TO THE FUEL TANK AND ENGINE.
3. PUT ON THROTTLE CONTROL AND GOVERNOR CONTROL LINKAGE.



JOB STEPS

READ:

20. PUT ON AIR FILTER, IF  
YOU HAVE ONE.

LOOK:

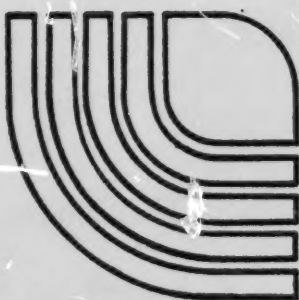
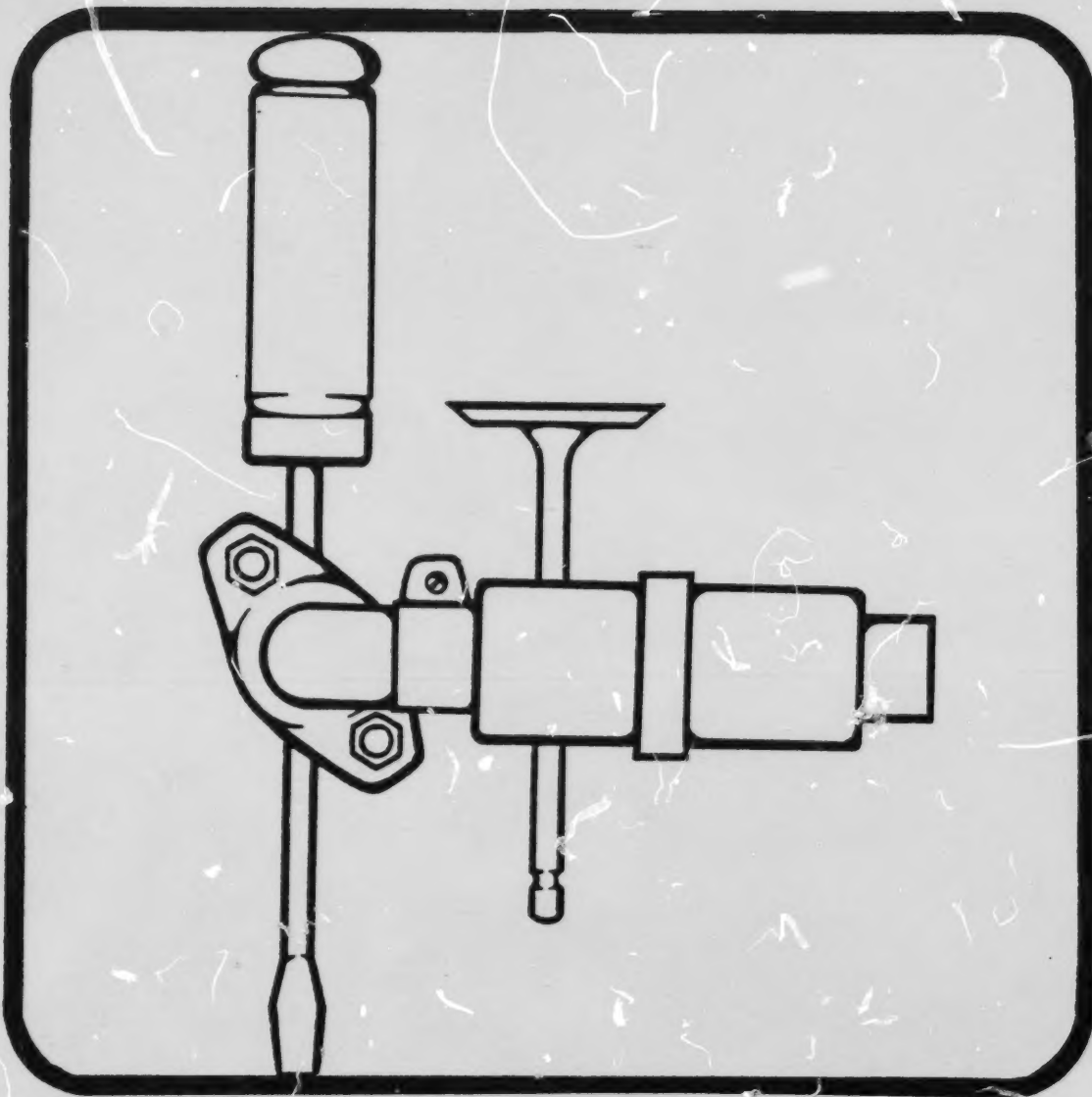


21. FILL FUEL TANK TO LEVEL  
NEEDED TO SET CARBURETOR  
(SEE SERVICE MANUAL).



CHECK: HAVE YOUR INSTRUCTOR CHECK YOUR WORK AND HELP YOU  
START AND SET THE ENGINE.





## small engine repair

unit: CARBURETOR

capital area career center

7501 05 005 1  
module: 7501 05 005 3 date: SEPTEMBER 1977 level:       

skill title: REMOVE AND REPLACE CARBURETOR

developed & written by: D. CONSTANTINI

visuals by: D. WEHRWEIN

WORD GUIDE

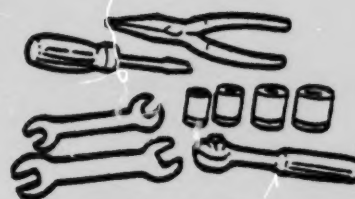
LINKAGE - PARTS WHICH CONNECT  
OTHER PARTS

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO TAKE OUT AND PUT BACK A NEW CARBURETOR ON AN AIR-COOLED ENGINE.

AND IN ORDER TO DO THIS YOU WILL NEED:

AN AIR-COOLED ENGINE  
WITH A VANE GOVERNOR



HAND TOOLS



SAFETY GLASSES



MANUAL FOR THE KIND OF ENGINE ON WHICH YOU WILL BE WORKING

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED ALL YOUR EQUIPMENT.
2. YOU MOUNT THE CARBURETOR SO THAT THERE ARE NO FUEL LEAKS; THE LINKAGE WORKS CORRECTLY; AND THE ENGINE RUNS WELL AFTER YOU ADJUST THE THROTTLE AND GOVERNOR.

"TURN THE PAGE"

INFORMATION

THERE ARE MANY DIFFERENT KINDS OF ENGINES, SO YOU WILL NEED A SERVICE MANUAL FOR THE KIND OF ENGINE ON WHICH YOU ARE WORKING.

READ: AIR COOLED MECHANICS TRAINING MANUAL, PAGES 33 - 35.

WHEN YOU PUT BACK A CARBURETOR, YOU SHOULD ALSO PUT IN A NEW GASKET. THIS WILL HELP SEAL THE CARBURETOR TO THE BLOCK.

WHEN YOU ARE READY TO ADJUST THE CARBURETOR WITH THE ENGINE RUNNING, LOOK AT MODULE 7501 05 007 1/7501 05 007 3.

"TURN THE PAGE"

JOB STEPS

READ:

1. GET ALL EQUIPMENT AND TAKE IT TO YOUR WORK AREA.

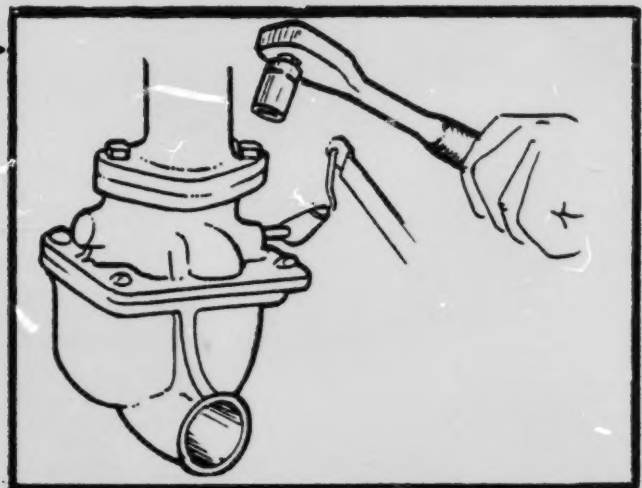
LOOK:



2. GET THE SERVICE MANUAL FOR THE KIND OF CARBURETOR ON WHICH YOU ARE WORKING. LOOK UP THE INSTRUCTIONS YOU WILL NEED.



3. USE A SOCKET SET WRENCH TO TAKE OUT THE NUTS THAT HOLD THE CARBURETOR TO THE BLOCK. WEAR YOUR SAFETY GLASSES.



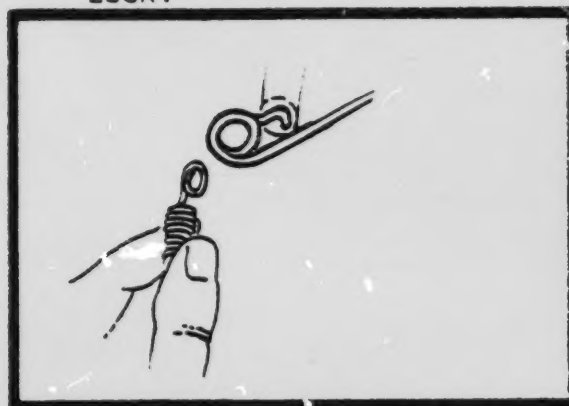
"TURN THE PAGE"

JOB STEPS

READ:

4. UNHOOK THE GOVERNOR CONTROL LINK AND SPRING.

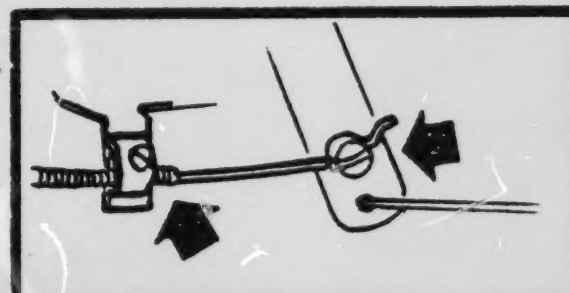
LOOK:



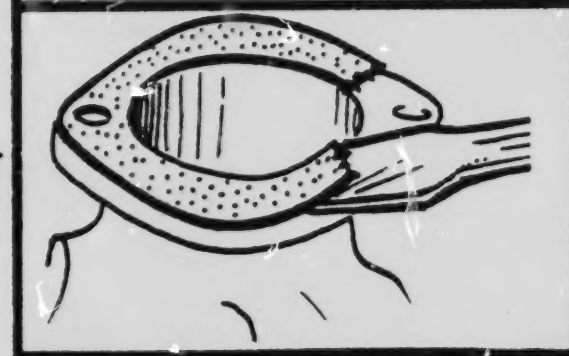
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. CORRECT SERVICE MANUAL.
3. TAKEN OUT THE NUTS THAT HOLD THE CARBURETOR TO THE BLOCK.
4. UNHOOKED GOVERNOR CONTROL LINK AND SPRING.

5. USE NEEDLE-NOSE PLIER TO TAKE OUT THE THROTTLE AND CHOKE LINKAGE.



6. USE GASKET SCRAPER TO CLEAN THE OLD GASKET.



"TURN THE PAGE"



JOB STEPS

READ:

LOOK:

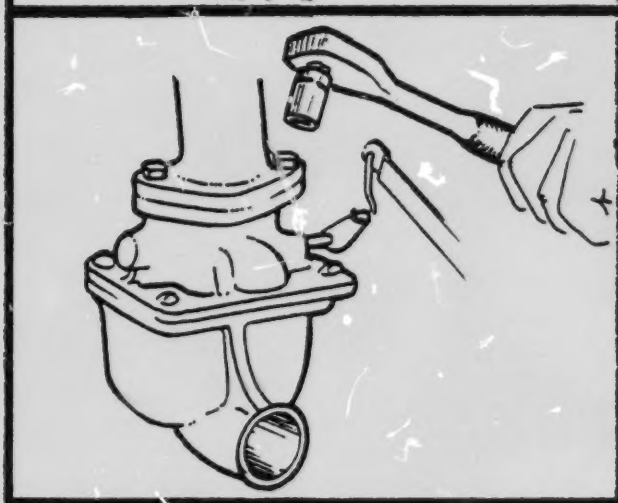
7. PUT THROTTLE AND CHOKE LINKAGE ONTO THE NEW CARBURETOR.



8. PUT GOVERNOR LINKAGE ON CARBURETOR.



9. BOLT NEW CARBURETOR ONTO THE BLOCK. BE SURE TO PUT IN NEW GASKET.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CLEANED OLD GASKET.
2. PUT THROTTLE AND CHOKE LINKAGE ONTO NEW THROTTLE.
3. PUT GOVERNOR LINKAGE ONTO CARBURETOR.
4. BOLTED CARBURETOR ONTO BLOCK.
5. PUT IN NEW GASKET.

"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

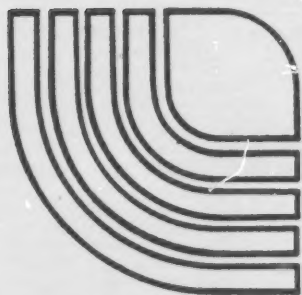
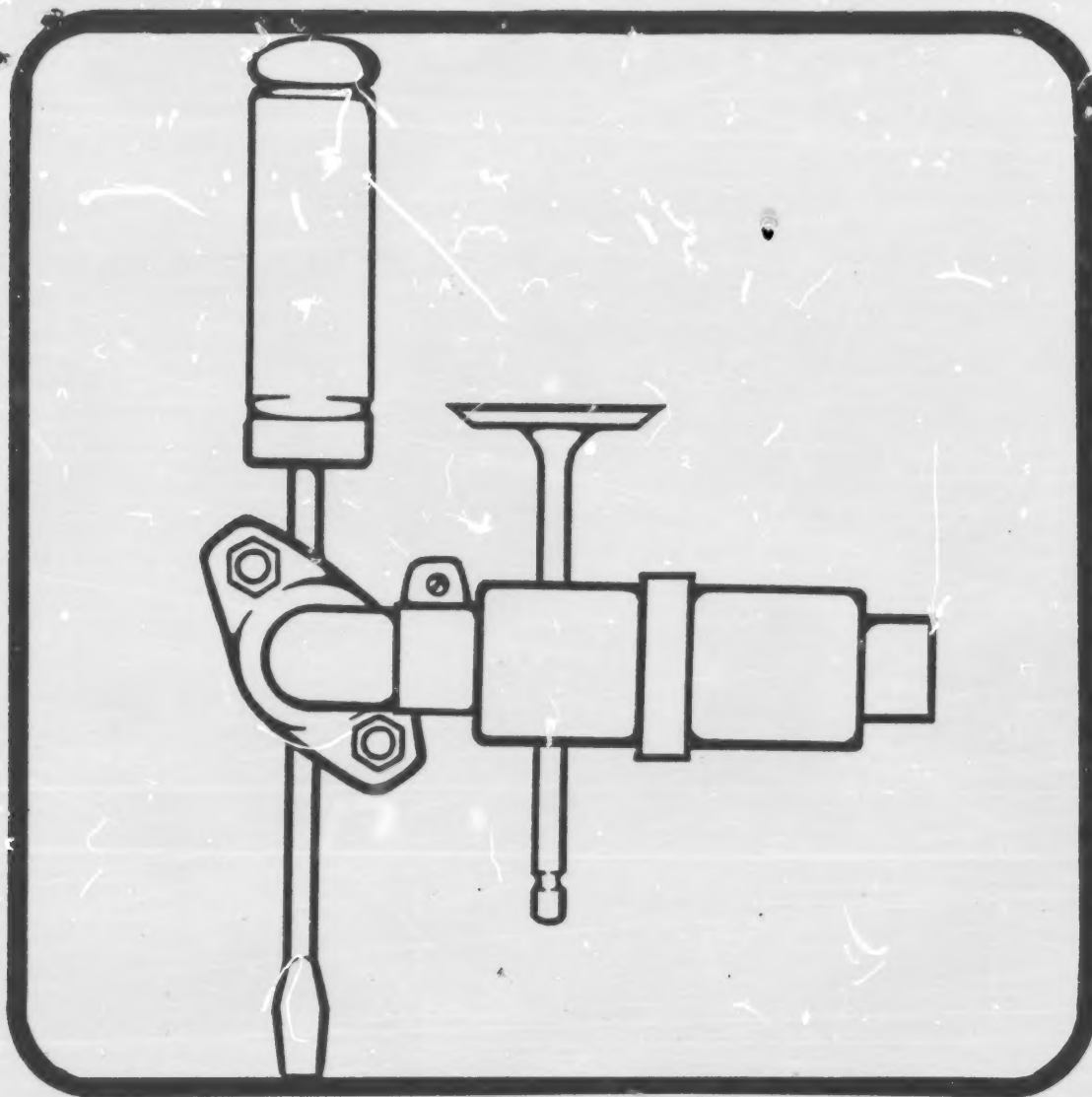
10. START THE ENGINE AND LET IT WARM UP. HAVE INSTRUCTOR WATCH YOU AS YOU START THE ENGINE.



11. ADJUST THE NEW CARBURETOR FOR PROPER ENGINE RUNNING. FOR HELP, USE MODULE 7501 05 001 1/7501 05 001 3.

12. HAVE INSTRUCTOR CHECK TO SEE IF ENGINE IS RUNNING PROPERLY.





## small engine repair

unit: CARBURETORS

capital area career center

module: 7501 05 006 1 7501 05 006 3 date: MAY 1977 level: I

skill title: SERVICE AND ADJUST GOVERNORS

developed & written by: HARRY WRIGHT

visuals by: DAVE WEHRWEIN

WORD GUIDE

ADJUST - MAKE AS CORRECT AS CAN BE  
LOAD - POWER OUTPUT  
SPECIFIED - ACCORDING TO THE MANUAL  
R.P.M. - ENGINE REVOLUTIONS PER  
MINUTE

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

1. HOW A GOVERNOR WORKS
2. HOW TO ADJUST AN AIR VANE GOVERNOR ON A BRIGGS & STRATTON ENGINE

AND IN ORDER TO DO THIS YOU WILL NEED:

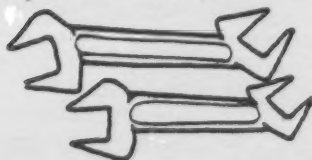
BRIGGS AND STRATTON ENGINE  
WITH AN AIR VANE GOVERNOR



SERVICE MANUAL



SAFETY GLASSES



OPEN-ENDED WRENCHES



LUBRICATION FLUID

WE WILL KNOW YOU CAN DO THIS WHEN:

1. YOU HAVE ALL YOUR EQUIPMENT.
2. THE ENGINE WORKS CORRECTLY (WITH OR WITHOUT LOAD) AT THE SPECIFIED R.P.M.

WORD GUIDE

CENTRIFUGAL - GOING IN A DIRECTION  
AWAY FROM THE CENTER

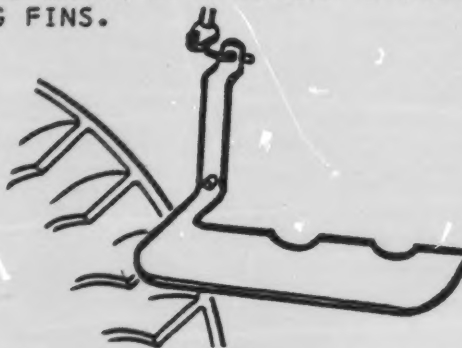
INFORMATION

ENGINE GOVERNORS DO THREE THINGS:

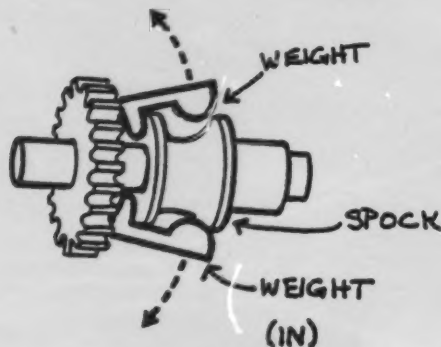
1. THEY KEEP THE CHOSEN ENGINE SPEED CONSTANT.
2. THEY KEEP THE ENGINE FROM RUNNING TOO FAST.
3. THEY KEEP THE ENGINE FROM RUNNING TOO SLOWLY.

THERE ARE TWO MAIN TYPES OF GOVERNORS:

1. THE AIR VANE GOVERNORS OPERATE BY A STREAM OF AIR CAUSED BY THE FLYWHEEL COOLING FINS.



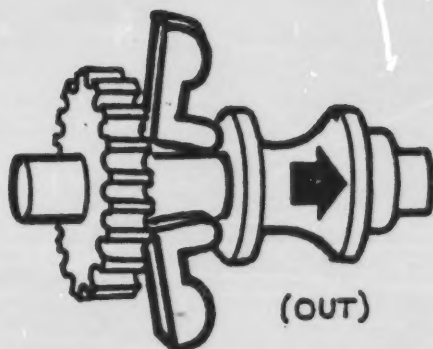
2. A CENTRIFUGAL, OR MECHANICAL, GOVERNOR USES WEIGHTS ATTACHED TO A SHAFT DRIVEN BY THE ENGINE.



THE ABOVE PICTURE SHOWS THE WEIGHTS "IN" WHILE THE ENGINE RUNS SLOWLY.

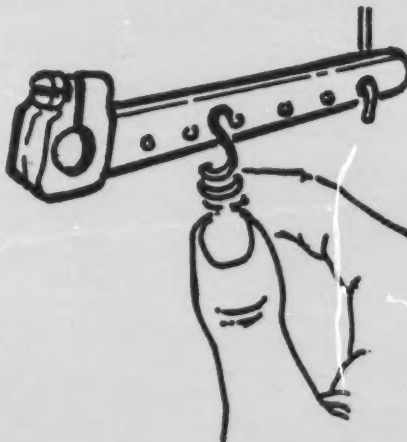
"TURN THE PAGE"



WORD GUIDE  
RANGE - FROM LOW TO HIGHREMOTE CONTROL - CONTROL OPERATED  
BY THE OPERATORINFORMATION

THIS PICTURE SHOWS THE WEIGHTS "OUT", WHILE THE ENGINE RUNS FAST. THE WEIGHTS PUSH THE SPOOL UP, CHANGING THE POSITION OF THE THROTTLE VALVE.

THE SPEED RANGE OF THE GOVERNOR CAN BE CHANGED BY ADJUSTING THE REMOTE CONTROL CABLE.



"TURN THE PAGE"

INFORMATION

ANOTHER WAY YOU CAN CHANGE THE GOVERNOR SPEED RANGE IS BY TURNING AN ADJUSTING NUT.



"TURN THE PAGE"

JOB STEPSREAD:

1. GET AN ENGINE WITH AN AIR VANE GOVERNOR FROM YOUR INSTRUCTOR AND GO TO YOUR WORK AREA.

2. GET THE SERVICE MANUAL FOR THE KIND OF ENGINE ON WHICH YOU ARE WORKING.

3. TAKE YOUR EQUIPMENT AND MATERIALS TO YOUR WORK AREA.

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. THE CORRECT ENGINE.
2. THE RIGHT SERVICE MANUAL.
3. THE RIGHT TOOLS.

"TURN THE PAGE"

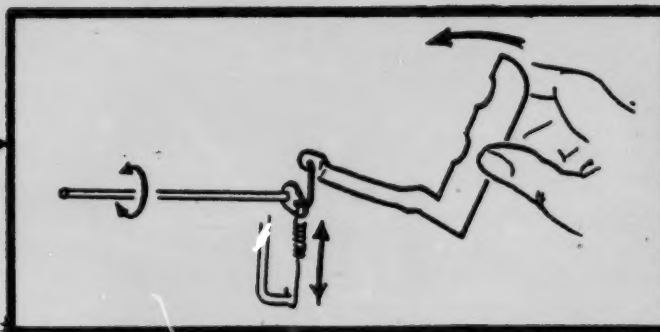
JOB STEPSREAD:LOOK:

4. PUT ON YOUR SAFETY GLASSES. →

5. START THE ENGINE TO SEE HOW IT'S RUNNING. LET IT RUN FOR A FEW MOMENTS TO WARM IT UP. HAVE YOUR INSTRUCTOR LISTEN WITH YOU. →

6. SHUT OFF THE ENGINE.

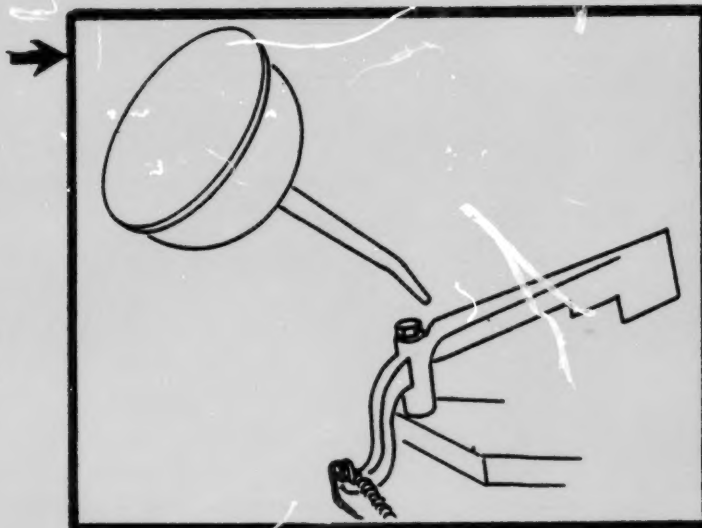
7. CHECK THE GOVERNOR LINKAGE. BE SURE IT WORKS EASILY AND SMOOTHLY. →



"TURN THE PAGE"

JOB STEPSREAD:

8. WITH LUBRICATING FLUID, LOOSEN UP ANY PARTS THAT DON'T WORK.

LOOK:

9. FIND THE SPEED ADJUSTING NUT ON THE GOVERNOR AND BE SURE IT TURNS.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. THE GOVERNOR LINKAGE WORKING.
2. THE SPEED ADJUSTING NUT TURNING PROPERLY.

10. CHECK WITH YOUR INSTRUCTOR TO SEE WHAT MODEL ENGINE YOU HAVE. THE CHART IN THE MANUAL WILL GIVE YOU THE OPERATING SPEED RANGE FOR THIS ENGINE.

IF YOU DON'T HAVE A MANUAL, READ THIS CHART:

BRIGGS & STRATTON RECOMMENDED OPERATING SPEED RANGES.

| <u>MODELS</u>               | <u>*ENGINE RPM</u> |
|-----------------------------|--------------------|
| 5S, 6S, 6HFB & 6HS. . . . . | 2200 - 3200        |
| OTHER 5 & 6 MODELS. . . . . | 2600 - 3600        |
| 8 & N . . . . .             | 2600 - 3600        |
| 9 . . . . .                 | 1800 - 3600        |
| 14. . . . .                 | 1800 - 3600        |

\*ENGINE RPM MAY DIFFER SLIGHTLY FOR DIFFERENT EQUIPMENT ON WHICH B & S ENGINES ARE USED. USE THE EQUIPMENT MANUFACTURER'S SPECS IN ALL CASES.

"TURN THE PAGE"



WORD GUIDE

MAGNETO - A DEVICE USED TO MAKE  
ELECTRIC POWER

BRACKET - USED TO ATTACH OR HOLD  
SOMETHING ON

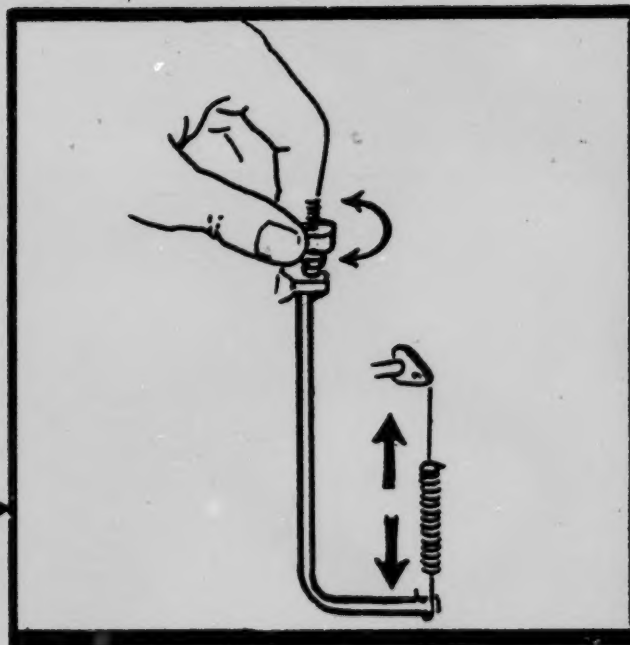
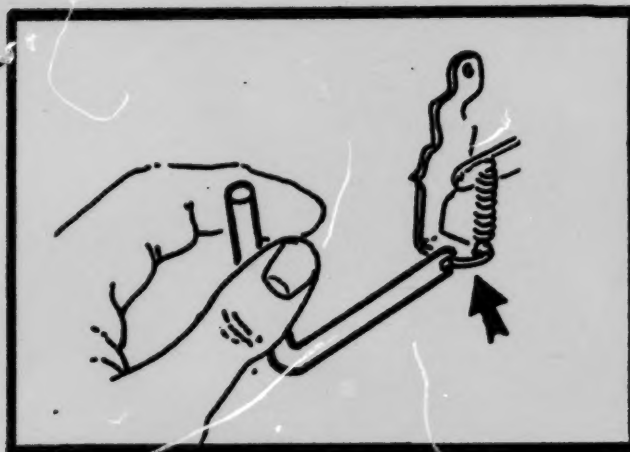
JOB STEPSREAD:

11. SEE THAT THE VANE DOES NOT  
RUB ON THE MAGNETO. THE VANE  
CAN BE ADJUSTED BY BENDING THE  
BRACKET.

12. START THE ENGINE.

13. TURN THE ADJUSTING NUT UP AND  
DOWN. SEE HOW THE ENGINE SPEED  
CHANGES?

14. SET THE GOVERNOR TO THE PROPER  
ENGINE RUNNING RANGE.

LOOK:

"TURN THE PAGE"

JOB STEPSREAD:LOOK:

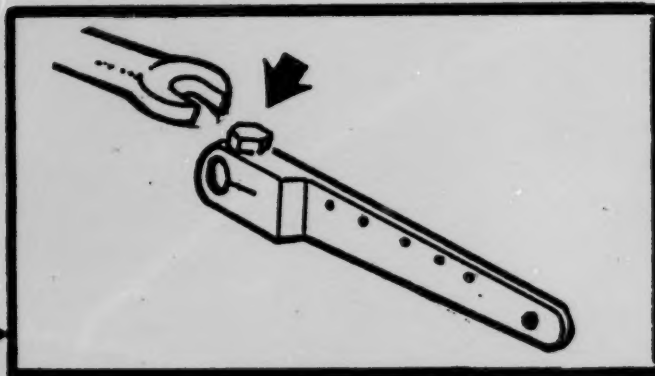
15. TURN OFF THE ENGINE.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

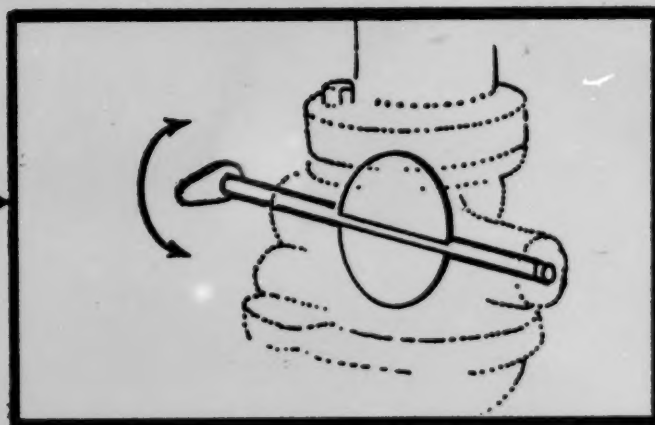
1. CHECKED THAT THE ENGINE SPEED CHANGES ARE ALL RIGHT.
2. CHECKED THAT THE GOVERNOR IS SET AT THE PROPER RUNNING RANGE.
3. TURNED OFF THE ENGINE.

IF YOUR GOVERNOR HAS A MECHANICAL LINKAGE, FOLLOW THE STEPS BELOW.  
IF YOUR GOVERNOR HAS A REMOTE CONTROL CABLE, GO TO PAGE 12.

16. WITH YOUR WRENCH, LOOSEN THE BOLT THAT ADJUSTS THE GOVERNOR LEVER TO THE GOVERNOR SHAFT.



17. SET THE CARBURETOR THROTTLE TO THE WIDE-OPEN POSITION.



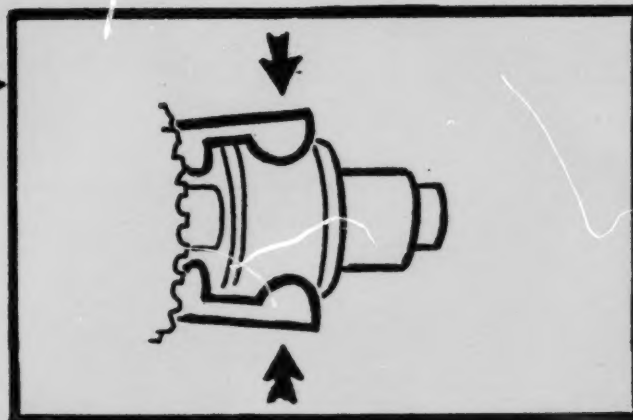
"TURN THE PAGE"

WORD GUIDE

CLAMP - USED TO HOLD TWO PIECES  
TOGETHER

JOB STEPSREAD:

18. TURN THE GOVERNOR WEIGHTS  
SO THEY ARE IN.

LOOK:

19. WITH YOUR WRENCH, TIGHTEN  
THE GOVERNOR CLAMP BOLT.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ADJUSTED THE GOVERNOR IN THE RIGHT WAY.
2. SET THE CARBURETOR THROTTLE WIDE OPEN.
3. TURNED THE GOVERNOR WEIGHTS IN.
4. TIGHTENED THE GOVERNOR CLAMP BOLT.

"TURN THE PAGE"

WORD GUIDE

LOCKNUTS - NUTS THAT KEEP THEMSELVES  
TIGHT BECAUSE OF THE WAY THEY  
ARE MADE

JOB STEPSREAD:

TO ADJUST THE GOVERNOR WITH  
A REMOTE CONTROL CABLE ONLY,  
READ THESE STEPS.

LOOK:

16. START THE ENGINE.

17. WHILE THE ENGINE IS RUNNING,  
LOOSEN THE ADJUSTING CONTROL  
LOCKNUTS WITH YOUR WRENCH.



18. LOOKING AT THE MANUAL, SET  
THE GOVERNOR TO THE DESIRED  
SETTING.



"TURN THE PAGE"

JOB STEPSREAD:LOOK:

19. WITH YOUR WRENCH, TIGHTEN  
THE LOCKNUTS.

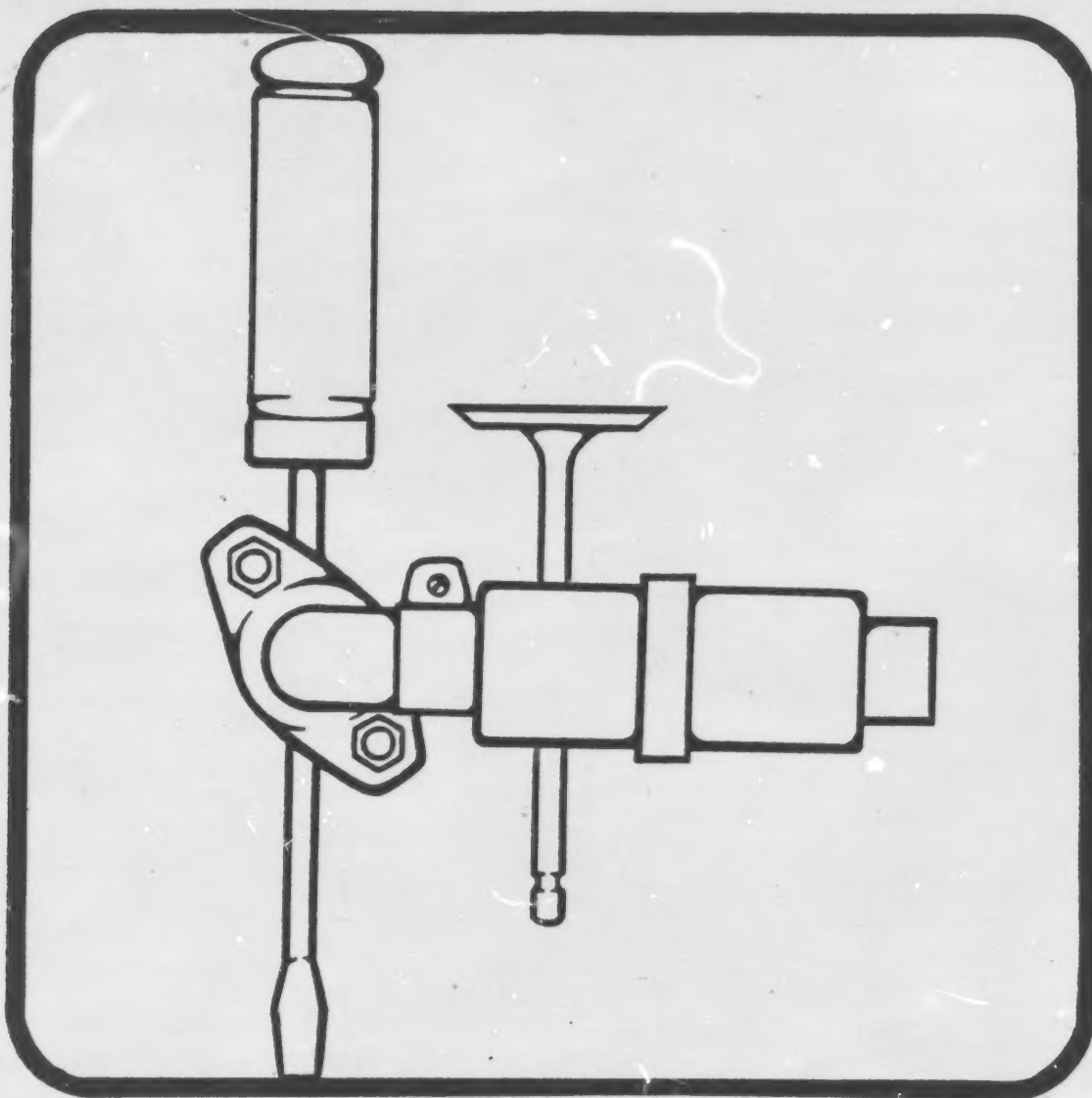


20. TURN OFF THE ENGINE.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. GOTTEN THE ENGINE TO RUN RIGHT.
2. SET THE GOVERNOR RIGHT.
3. TIGHTENED THE LOCKNUTS.
4. TURNED OFF THE ENGINE.





## small engine repair

unit: CARBURETORS

capital area career center

module: 7501 05 007 1  
7501 05 007 3 date: DECEMBER 1977 level: I

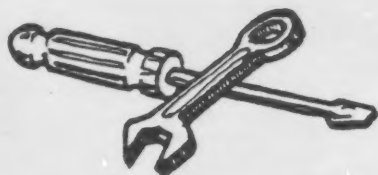
skill title: ENGINE RUNNING - HIGH AND LOW SPEED ADJUSTMENTS

developed & written by: JIM PITTS AND DWIGHT SMITH

visuals by: DAVE WEHRWEIN

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

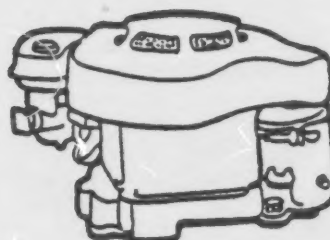
HOW TO ADJUST A CARBURETOR ON A RUNNING BRIGGS AND STRATTON 2-CYCLE ENGINE.

IN ORDER TO DO THIS YOU WILL NEED:

HAND TOOLS



B &amp; S SERVICE MANUAL

2-CYCLE B & S ENGINE  
IN RUNNING ORDER

SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED ALL THE MATERIALS FOR THIS MOD.
2. YOU HAVE READ THE JOB STEPS.
3. YOU HAVE ADJUSTED THE ENGINE SO THAT IT RUNS SMOOTHLY WITHIN THE SPECIFICATIONS SET BY THE MANUFACTURER.
4. YOU HAVE PUT AWAY ALL THE EQUIPMENT AND SUPPLIES AND CLEANED THE WORK AREA.

"TURN THE PAGE"

JOB STEPS

## READ:

1. GO TO THE WORK AREA WITH THE EQUIPMENT LISTED ON PAGE 2 OF THIS MODULE.

2. BE SURE YOU HAVE THE RIGHT SERVICE MANUAL FOR THE ENGINE YOU ARE WORKING ON.

3. LEARN THE THREE ADJUSTMENTS NEEDED ON A CARBURETOR. THERE ARE THREE ADJUSTMENTS TO MAKE FOR ALMOST ALL CARBURETORS:

- A. IDLE SPEED
- B. IDLE FUEL
- C. FULL LOAD FUEL

LOOK AT THE PICTURE CAREFULLY. BE SURE YOU CAN FIND ALL THREE ADJUSTMENTS ON YOUR ENGINE.

NOTE: SOME CARBURETORS DO NOT HAVE AN IDLE FUEL ADJUSTMENT.

## LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

- 1. ALL THE EQUIPMENT AND SUPPLIES.
- 2. THE RIGHT SERVICE MANUAL FOR THE ENGINE.
- 3. STUDIED THE PICTURE OF THE CARBURETOR AND CAN FIND ALL THREE ADJUSTMENTS ON THE ENGINE YOU ARE WORKING ON.

"TURN THE PAGE"

JOB STEPS

READ:

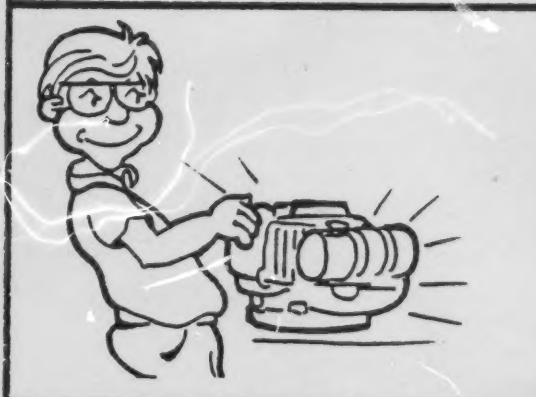
\*\*\*\*\*  
 \*\* CAUTION: ALWAYS BE SURE THE MOWER  
 \*\* BLADE IS CLEAR BEFORE  
 \*\* STARTING ENGINE. \*\*\*\*\*

4. START THE ENGINE AND LET IT WARM UP.

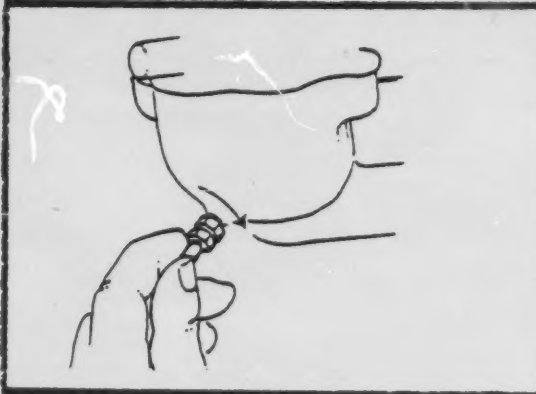
LOOK:



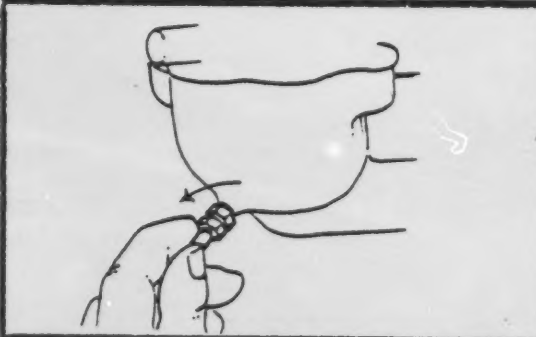
5. RUN ENGINE AT OPERATING SPEED UNDER FULL LOAD.



6. TURN IN LOAD FUEL ADJUSTMENT UNTIL THE ENGINE STARTS TO RUN ROUGH OR MISS.



7. SLOWLY TURN OUT THE LOAD FUEL SCREW UNTIL THE ENGINE RUNS SMOOTHLY.



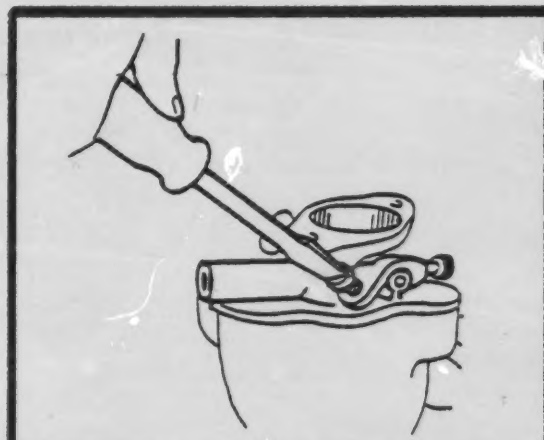
3. SLOW ENGINE DOWN TO IDLE SPEED.

JOB STEPS

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

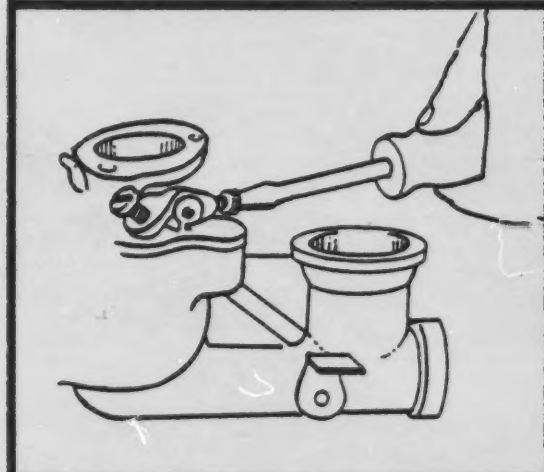
1. WARMED UP THE ENGINE.
2. ADJUSTED IT UNDER FULL LOAD.
3. SLOWED ENGINE DOWN TO IDLE.

9. USE A SCREWDRIVER TO ADJUST THE IDLE SPEED TO ABOUT 1750 RPM.



10. NOW ADJUST THE IDLE MIXTURE:

- A. TURN THE IDLE FUEL SCREW UNTIL THE ENGINE IDLES SMOOTHLY.
- B. TURN THE SCREW IN UNTIL THE ENGINE RUNS ROUGHLY.
- C. TURN OUT THE IDLE FUEL SCREW UNTIL THE ENGINE RUNS SMOOTHLY.
- D. CHECK THE IDLE SPEED AGAIN. RESET IT IF NEEDED.



11. CHECK THE ENGINE OPERATION. MOVE THE SPEED CONTROL FROM IDLE TO FULL SPEED. THE ENGINE SHOULD SPEED UP SMOOTHLY WITHOUT SPUTTERING OR HESITATING.

12. IF YOU THINK THE GOVERNOR NEEDS ADJUSTMENT, ASK YOUR INSTRUCTOR. IF IT NEEDS ADJUSTING, USE WHAT YOU LEARNED FROM MOD 7501 05 006 3 AND RESET IT.



"TURN THE PAGE"



JOB STEPS

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

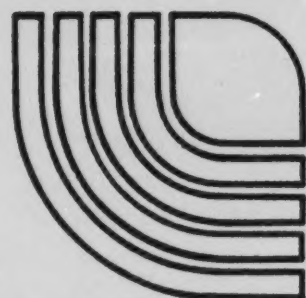
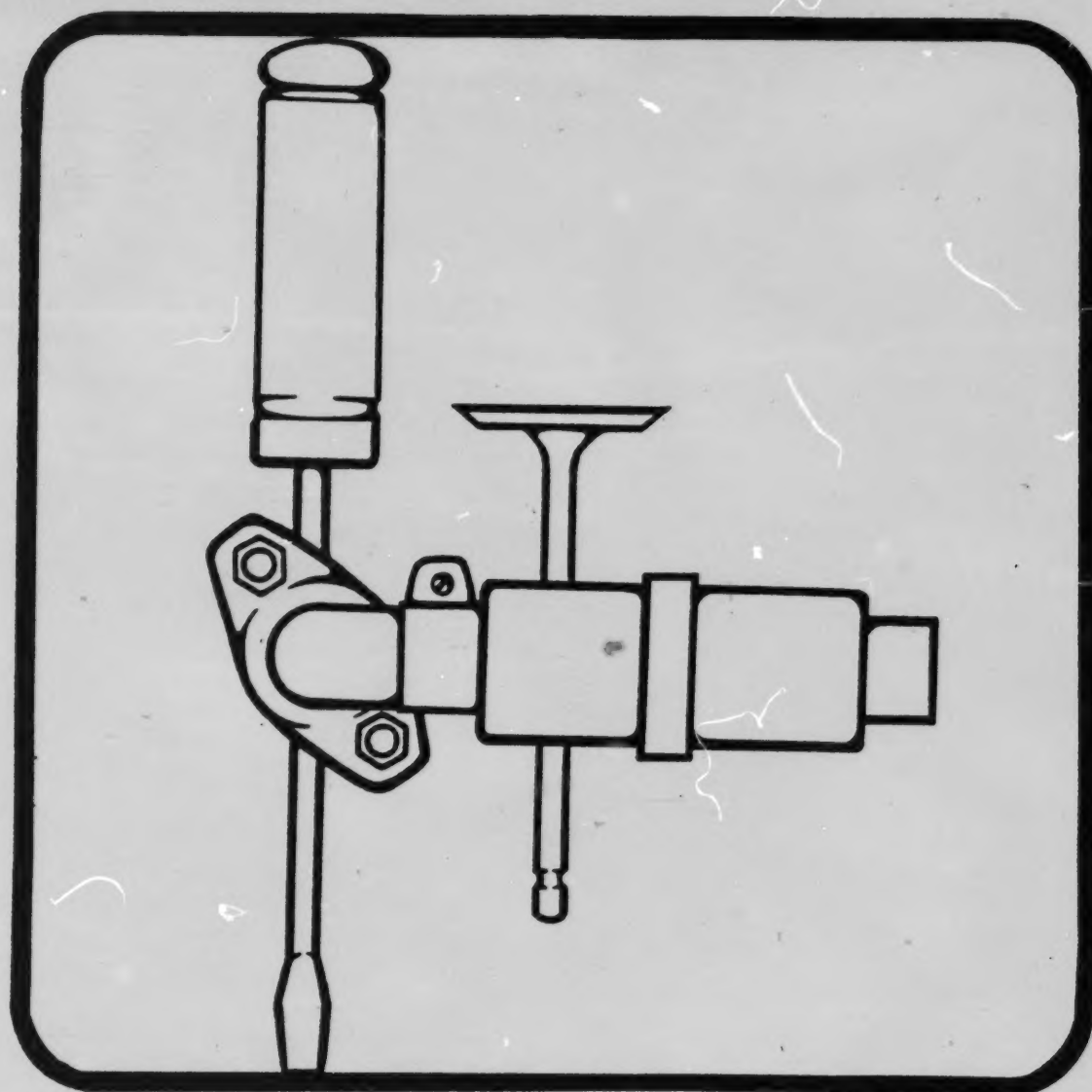
1. ADJUSTED IDLE SPEED.
2. ADJUSTED IDLE FUEL.
3. CHECKED OPERATION OF THE ENGINE.
4. RESET THE GOVERNOR IF NEEDED.

13. PUT AWAY ALL TOOLS AND EQUIPMENT YOU USED.

14. CLEAN UP THE WORK AREA.



CHECK: HAVE YOUR INSTRUCTOR CHECK YOUR WORK AREA.



## small engine repair

unit: ELECTRICAL

capital area career center

module: 7501 06 001 1  
7501 06 001 3 date: JULY 1977 level: I

skill title: CHECKING AN ELECTRIC START SYSTEM

developed & written by: DWIGHT SMITH

visuals by: DAVE WEHRWEIN

WORD GUIDE

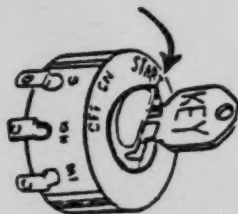
BRIDGING - BYPASSING.

VOLT-OHMETER - A METER USED TO MEASURE VOLTAGE AND RESISTANCE OF ELECTRICAL PARTS.

SOLENOID - AN ELECTRICAL MAGNETIC SWITCH.

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

1. HOW TO CHECK AN ELECTRICAL STARTING SYSTEM INCLUDING:
  - A. STARTER SWITCH
  - B. SOLENOID
  - C. STARTER MOTOR
  - D. WIRING
2. HOW TO CHECK THE CIRCUITS COMPLETENESS BY "BRIDGING" THE COMPONENTS IN THE SYSTEM.

AND IN ORDER TO DO THIS YOU WILL NEED:

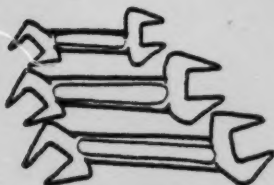
12 VOLT STARTING SYSTEM



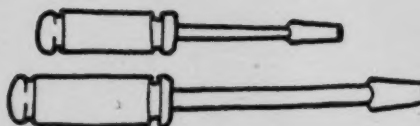
VOLT-OHMETER



SOCKET SET



OPEN END WRENCH SET



SCREWDRIVER SET

: TURN THE PAGE

WE WILL KNOW THAT YOU CAN DO IT WHEN:

THE ELECTRICAL STARTING SYSTEM YOU CHECK HAS A COMPLETE  
CIRCUIT AND STARTS THE ENGINE.

JOB STEPS

READ:

1. TAKE ALL EQUIPMENT AND MATERIALS TO YOUR WORK AREA.

2. FIND THE SECTION ON STARTING SYSTEMS IN THE SERVICE MANUAL.

WHAT KIND OF SYSTEM DOES YOUR ENGINE HAVE?

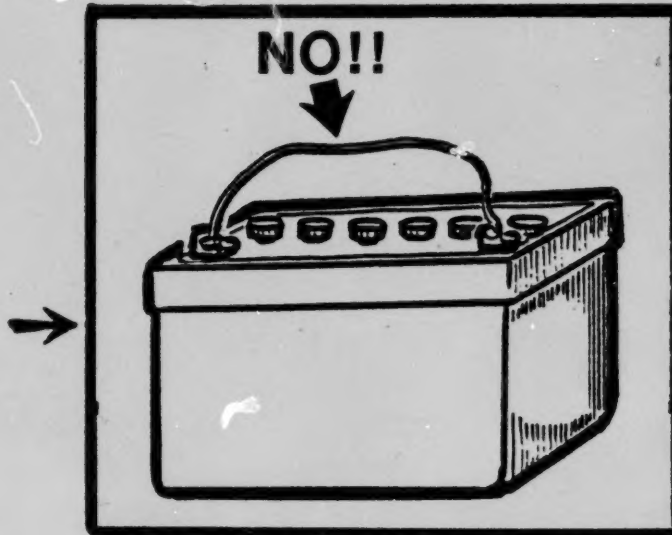
- A. STARTER-GENERATOR WITH MANUAL START SWITCH; OR
- B. STARTER GENERATOR WITH SOLENOID AND KEY.

3. READ THE SECTION ON THE STARTING SYSTEM FOR YOUR ENGINE. BE SURE YOU KNOW THE LOCATION AND FUNCTION OF EACH PART.

\*\*\*\*\*  
 \* CAUTION - BE CAREFUL OF THE \*  
 \* BATTERY. IT CONTAINS VERY \*  
 \* STRONG ACID. NEVER CONNECT \*  
 \* A JUMPER WIRE ACROSS THE \*  
 \* BATTERY, AS IT MAY EXPLODE. \*  
 \* \*\*\*\*\*

4. WHEN YOU KNOW THE LAYOUT OF THE STARTER SYSTEM, DISCONNECT THE SPARK PLUG WIRE AND THE BATTERY.

LOOK:





JOB STEPS

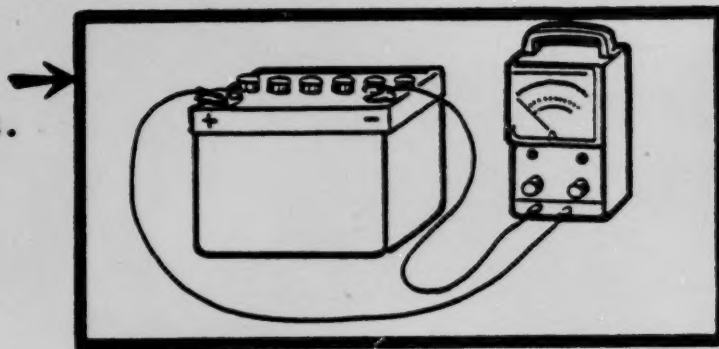
READ:

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

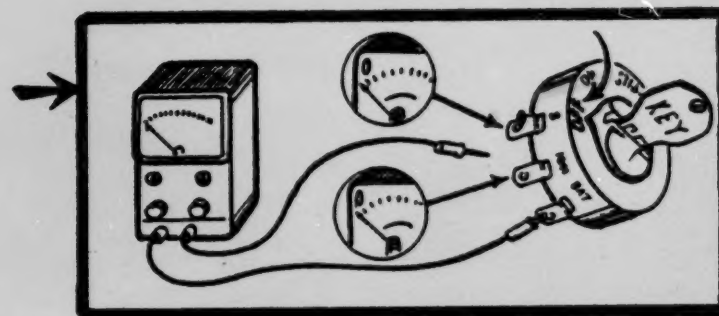
1. ALL THE EQUIPMENT FOR THIS MOD.
2. THE LAYOUT OF THIS ELECTRICAL SYSTEM.
3. DISCONNECTED THE BATTERY AND SPARK PLUG.

5. NOW, CHECK THE BATTERY, USING THE VOLT-OHMETER. SET THE METER FOR VOLTS AND CHECK THE VOLTAGE ACROSS THE TERMINALS. IF YOU DO NOT REMEMBER HOW, ASK YOUR INSTRUCTOR FOR HELP.



6. CHECK THE STARTER SWITCH LIKE THIS:

1. SET THE VOLT-OHMETER TO "RESISTANCE".
2. TURN THE STARTER SWITCH TO OFF.



7. CHECK THE RESISTANCE BETWEEN ALL THE TERMINALS ON THE SWITCH. THERE SHOULD BE NO CONNECTIONS BETWEEN ANY OF THEM.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE BATTERY VOLTAGE.
2. CHECKED THE STARTER SWITCH TO OFF.

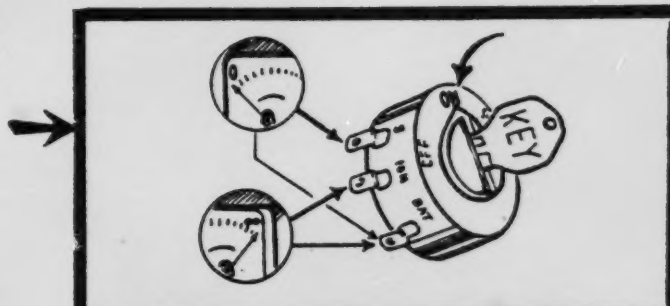
TURN THE PAGE

JOB STEPS

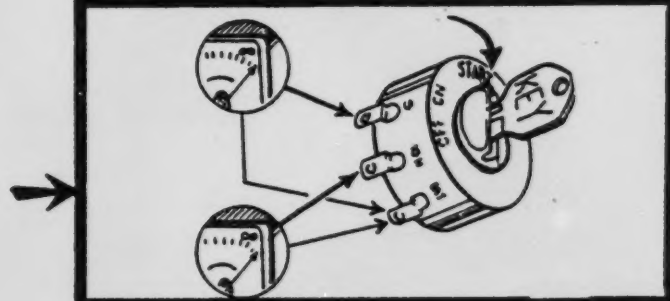
READ:

LOOK:

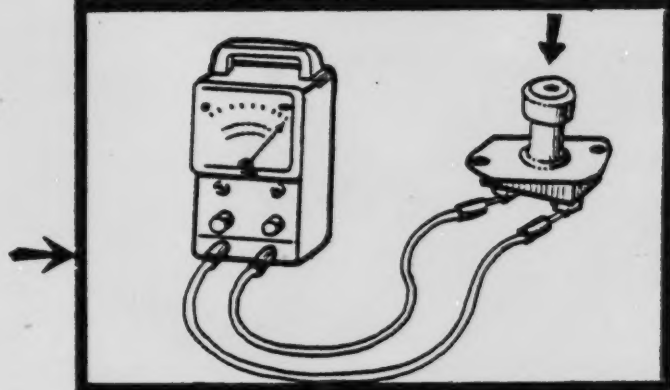
8. TURN THE STARTER SWITCH TO ON. CHECK THE RESISTANCE BETWEEN ALL THE TERMINALS. YOU SHOULD FIND A CONNECTION BETWEEN THE BATTERY TERMINAL AND THE IGNITION TERMINAL.



9. HOLD THE STARTER SWITCH ON START. CHECK THE RESISTANCE BETWEEN ALL THE TERMINALS. YOU SHOULD FIND CONNECTIONS BETWEEN ALL OF THEM. IF THE SWITCH FAILS ANY OF THESE TESTS, ASK YOUR INSTRUCTOR FOR A NEW SWITCH.



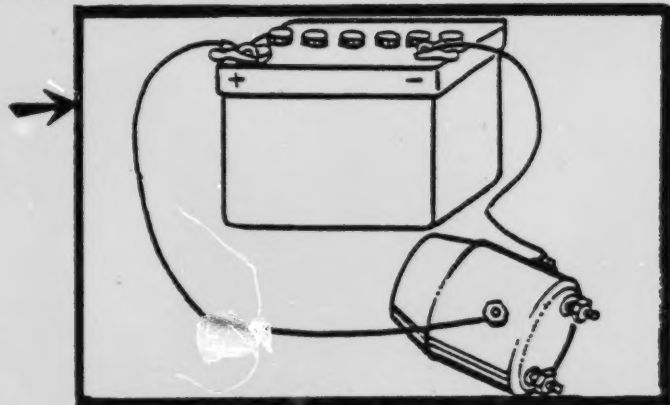
10. TO CHECK A MANUAL STARTER SWITCH, PUSH THE BUTTON AND CHECK FOR RESISTANCE BETWEEN THE TERMINALS. THERE SHOULD BE A CONNECTION BETWEEN ALL OF THEM. IF THE MANUAL SWITCH FAILS TO MAKE A CONNECTION. ASK YOUR INSTRUCTOR FOR A NEW SWITCH.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE STARTER SWITCH AT ON.
2. CHECKED THE STARTER AT START, OR
3. CHECKED THE MANUAL STARTER.

11. CHECK THE OPERATION OF THE SOLENOID BY HOOKING IT UP TO A BATTERY. CHECK THE OPERATION WITH THE VOLT-OHMETER. ASK YOUR INSTRUCTOR TO HELP YOU WITH THE HOOK-UP.



JOB STEPS

READ:

LOOK:

12. THE SOLENOID SHOULD SNAP OR CLICK WHEN THE BATTERY IS CONNECTED. WHEN THE SOLENOID SNAPS, THE METER SHOULD GO TO "0". IF NOT, ASK YOUR INSTRUCTOR FOR A NEW SOLENOID.

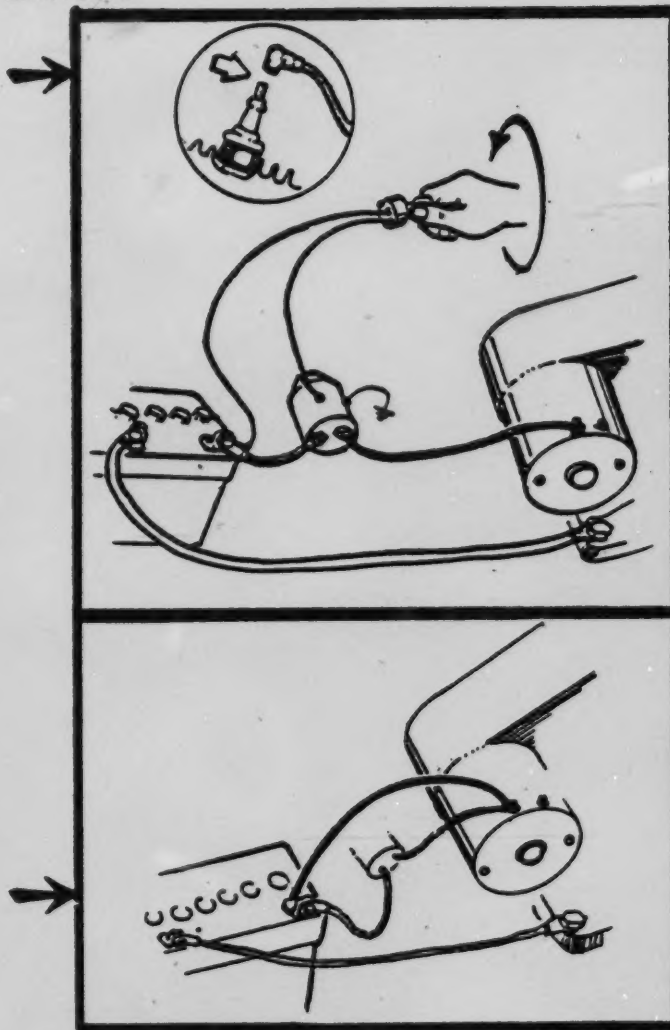
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ASKED YOUR INSTRUCTOR TO CHECK THE SOLENOID FOR PROPER OPERATION.

13. CONNECT ALL THE WIRES FOR THE STARTING CIRCUIT. BE SURE ALL THE CONNECTIONS ARE THE SAME AS WHEN YOU TOOK THEM OFF. DO NOT CONNECT THE SPARK PLUG YET.

14. TRY THE STARTER SWITCH. IF IT TURNS OVER THE ENGINE, GO ON TO JOB STEP 16. IF THE ENGINE DOES NOT TURN, THE STARTER MOTOR MAY BE FAULTY.

15. TO CHECK THE STARTER MOTOR, BRIDGE A COMPLETE CIRCUIT FROM THE BATTERY TO THE STARTER WITH A JUMPER WIRE. IF THE STARTER WORKS NOW, CHECK THE WIRING FOR BREAKS OR BAD CONNECTIONS. IF THE STARTER STILL DOES NOT TURN THE ENGINE, IT MAY BE FAULTY. ASK YOUR INSTRUCTOR FOR HELP.



JOB STEPS

READ:

16. RECONNECT THE SPARK PLUG WIRE.

LOOK:



17. START THE ENGINE. IF THE ENGINE DOES NOT START, ASK YOUR INSTRUCTOR FOR HELP.

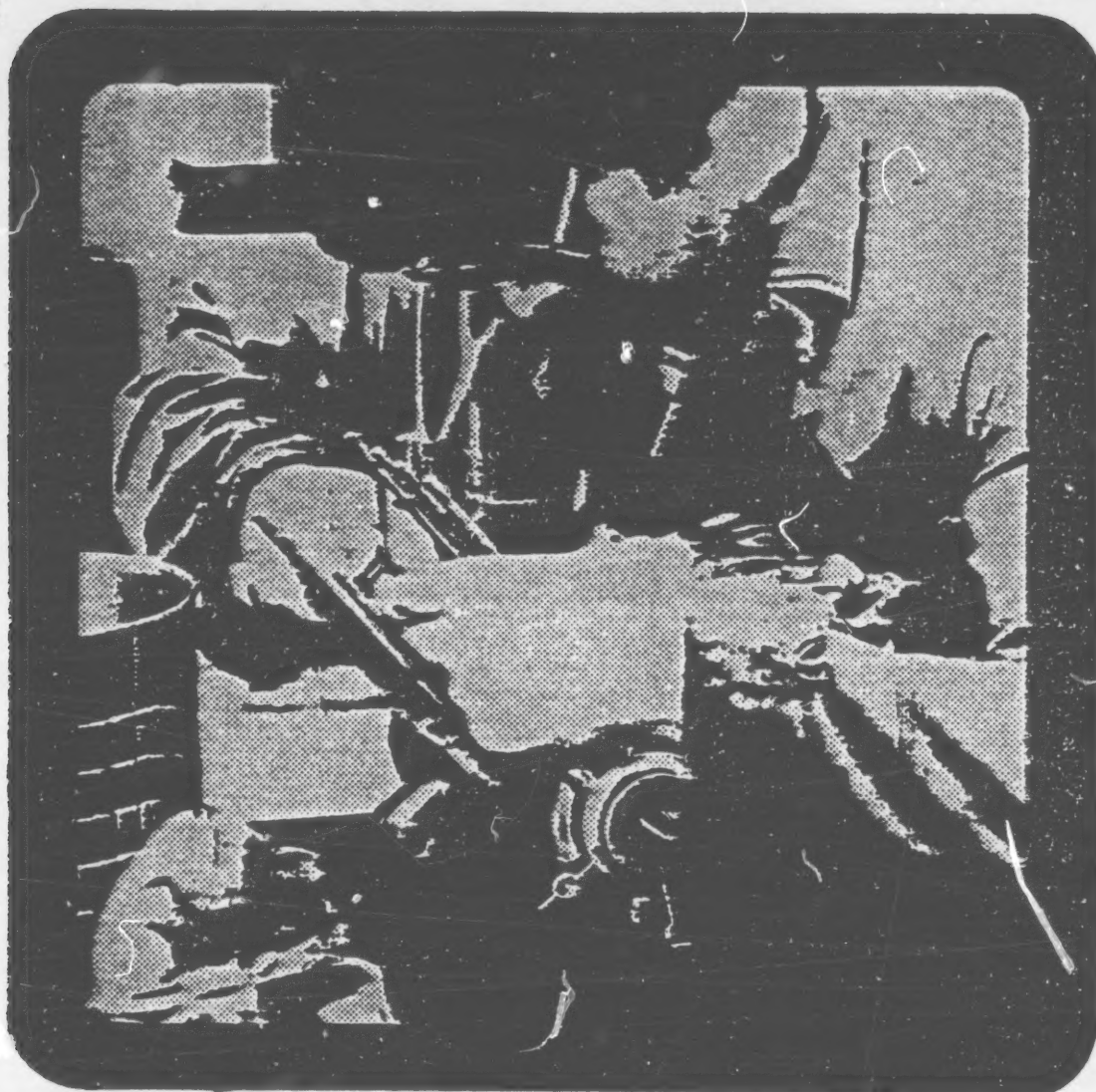


18. CLEAN UP YOUR WORK AREA. BE SURE TO PUT AWAY ALL TOOLS AND EQUIPMENT.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL THE WIRES FOR THE STARTING CIRCUIT ARE CONNECTED CORRECTLY.
2. THE MACHINE STARTS AND RUNS PROPERLY.
3. THE WORK AREA IS CLEAN AND ALL TOOLS HAVE BEEN PUT AWAY.





## small engine repair

unit: ELECTRICAL

capital area career center

module: 7501 06 002 1 date: 8/77 level:         
7501 06 002 3

skill title: "CHECK AC CHARGING SYSTEM"

developed & written by: DWIGHT SMITH

visuals by: DAVE WEHRWEIN



WORD GUIDE

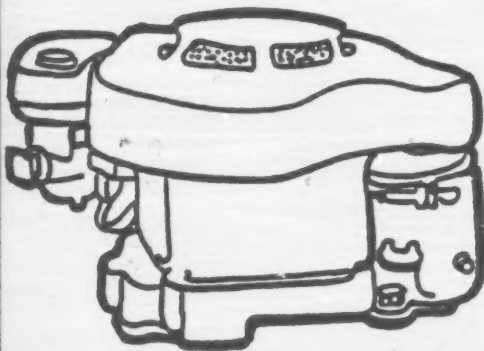
RECTIFIER - ELECTRICAL DEVICE TO CHANGE  
AC (ALTERNATING CURRENT)  
INTO DC (DIRECT CURRENT).

STATOR - THE PART OF AN ALTERNATOR  
THAT DOES NOT MOVE.

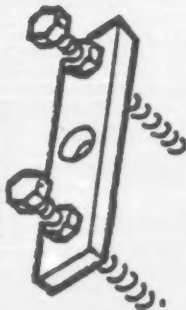
PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO CHECK AN AC CHARGING SYSTEM-INCLUDING THE RECTIFIERS-  
WITH A VOLT-OHMMETER.

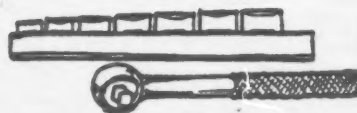
HOW TO CHECK THE STATOR AND THE STATOR CELLS FOR SIGNS OF  
HEAT OR CRACKING.

AND IN ORDER TO DO THIS YOU WILL NEED:

AN ENGINE WITH AN  
AC CHARGING SYSTEM



IMPACT NUT  
OR PULLER



SOCKET SET

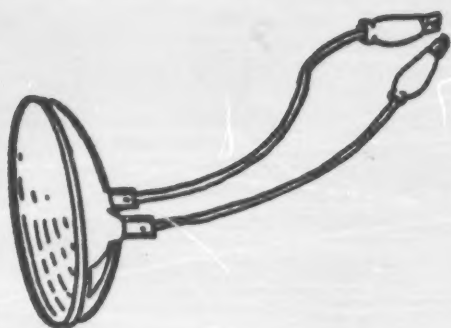


SAFETY  
GLASSES

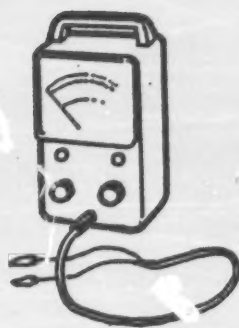
"TURN THE PAGE"

WORD GUIDE

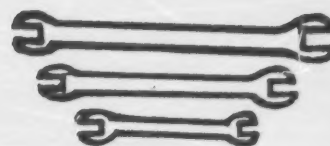
LOAD LAMP - A LIGHT BULB USED TO CHECK THE OUT-PUT OF A CHARGING SYSTEM.



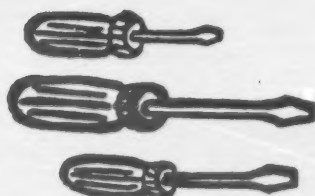
LOAD LAMP WITH LEADS



VOLT OHMMETER



OPEN-END WRENCH SET



SCREWDRIVER SET



TORQUE WRENCH



HAMMER



SERVICE MANUAL

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED THE TOOLS AND EQUIPMENT FOR THIS MOD.
2. THE CHARGING SYSTEM AND THE ENGINE ON WHICH YOU WORKED, WORKS LIKE THE SERVICE MANUAL SAYS IT SHOULD.
3. YOU HAVE CLEANED THE WORK AREA AND RETURNED ALL TOOLS AND EQUIPMENT.

"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

1. TAKE ALL EQUIPMENT TO YOUR WORK AREA.

2. CHECK THE MAKE AND MODEL OF YOUR ENGINE.



3. GET THE SERVICE MANUAL FOR THIS ENGINE AND READ THE SECTION ABOUT THE CHARGING SYSTEM. IS THE CHARGING SYSTEM 1-1/2 AMP? DOES IT HAVE A DUAL CIRCUIT? WHEN YOU KNOW WHAT KIND OF CHARGING SYSTEM YOU ARE WORKING ON, GO ON TO THE NEXT JOB STEP.



WEAR YOUR SAFETY GLASSES

4. TAKE THE SPARK PLUG WIRE OFF THE SPARK PLUG.

"TURN THE PAGE:

WORD GUIDE

KEY - A PIECE OF METAL TO KEEP  
THE FLYWHEEL FROM MOVING  
ON THE CRANKSHAFT.

JOB STEPS

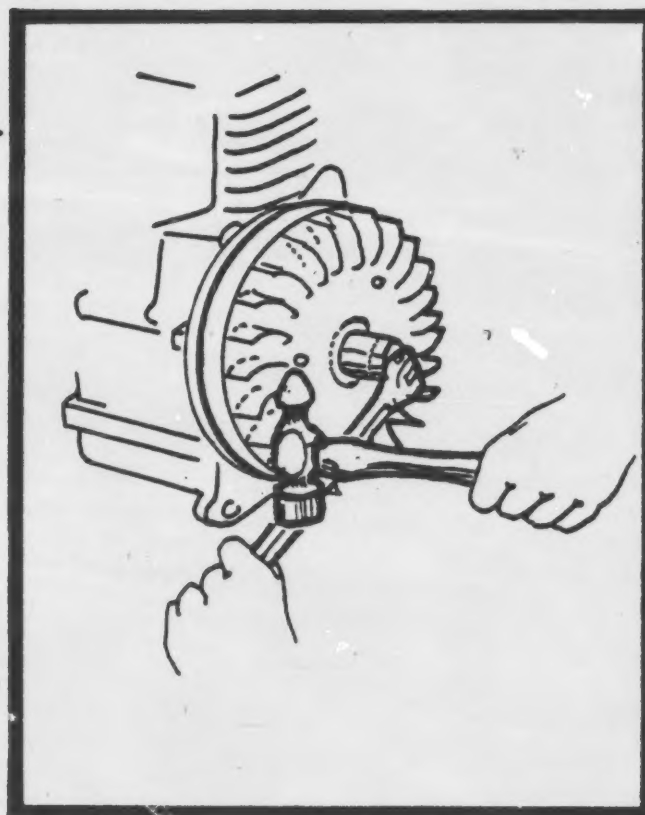
READ:

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL THE EQUIPMENT FOR THIS MOD.
2. READ THE ELECTRICAL SECTION OF THE MANUAL.
3. FOUND OUT WHAT KIND OF CHARGING SYSTEM IS ON IT.
4. TAKEN OFF THE SPARK PLUG WIRE.
5. USING A WRENCH AND SCREWDRIVER TAKE OFF THE FLYWHEEL COVER OR SHROUD.

6. USING THE IMPACE NUT PULLER AND A HAMMER, REMOVE THE FLY-  
WHEEL. BE CAREFUL NOT TO  
LOSE THE KEY.

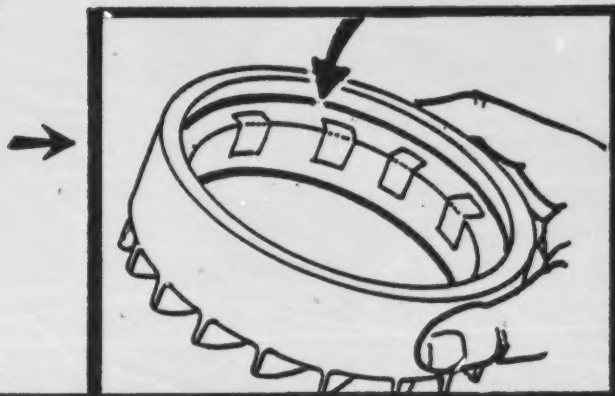


"TURN THE PAGE"

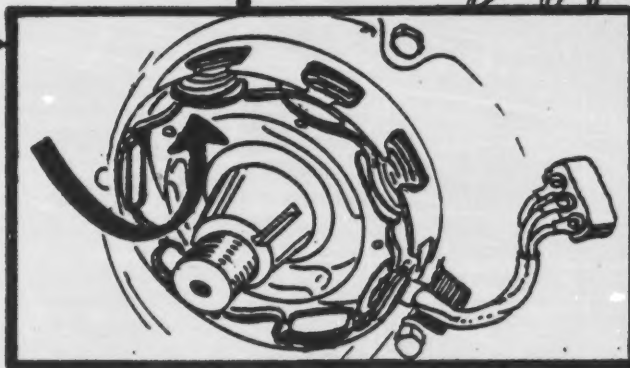
JOB STEPS

## READ:

7. LOOK AT THE MAGNET RING ON THE INSIDE OF THE FLYWHEEL. CHECK THAT IT ISN'T LOOSE OR BROKEN AND LOOK FOR SIGNS OF RUBBING ON THE STATOR.



8. CHECK THE COILS ON THE STATOR FOR CRACKING, RUBBING, OR BURNT SPOTS. IF THERE ARE, SHOW THEM TO YOUR INSTRUCTOR.

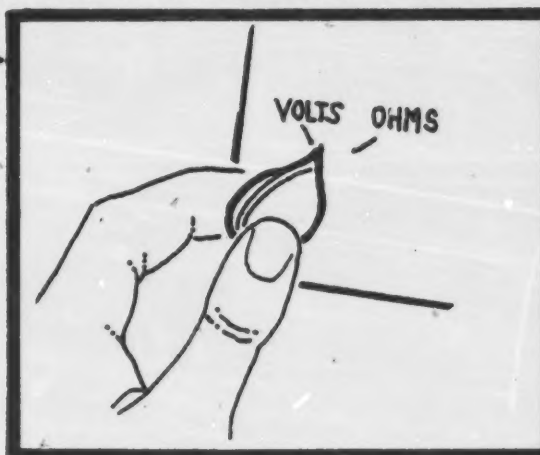


CHECK: ASK YOUR INSTRUCTOR TO SEE THAT YOU HAVE:

1. REMOVED THE FLYWHEEL SHROUD OR COVER.
2. REMOVED THE FLYWHEEL.
3. CHECKED THE MAGNET RING INSIDE THE FLYWHEEL.
4. CHECKED THE STATOR COILS FOR DAMAGE OR WEAR.

9. SET THE VOLT-OHMMETER TO OHMS.

- A. UNPLUG THE STATOR WIRES.
- B. USE A SCREWDRIVER CONNECTED TO THE VOLT-AMMETER (ON THE 1-1/2 AMP MODEL, THE RECTIFIER BOX MUST NOT TOUCH THE ENGINE).
- C. CHECK FOR CONNECTION BETWEEN THE STATOR WIRES AND THE ENGINE BLOCK. YOU SHOULD FIND NONE.



"TURN THE PAGE"

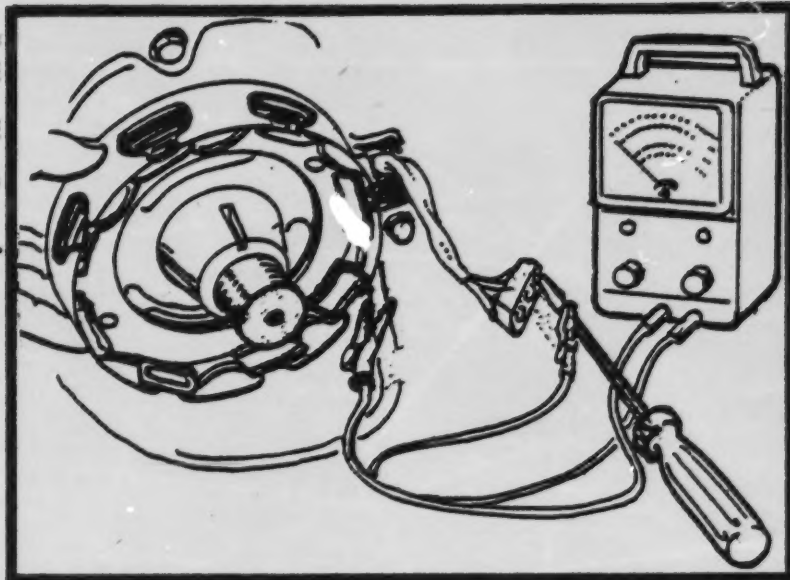


JOB STEPS

READ:

LOOK:

10. USING A SCREWDRIVER, VOLT-OHMMETER AND WRENCH, CHECK THE RECTIFIER (ON 1-1/2 AMP MODEL BOLT THE RECTIFIER BACK ON THE ENGINE). CHECK THE SERVICE MANUAL FOR THE CORRECT HOOK-UP FOR THIS TEST. IF YOU NEED HELP, ASK YOUR INSTRUCTOR.

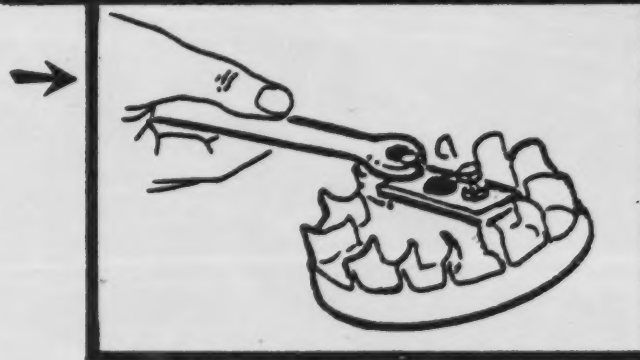


11. PUT THE FLYWHEEL AND THE KEY BACK ON THE CRANKSHAFT.

12. USING THE TORQUE WRENCH, TIGHTEN THE NUT AS MUCH AS THE SERVICE MANUAL SAYS.



13. USING THE SCREWDRIVER AND/OR WRENCH, REPLACE THE FLYWHEEL COVER AND SHROUD.



"TURN THE PAGE"

JOB STEPS

READ:

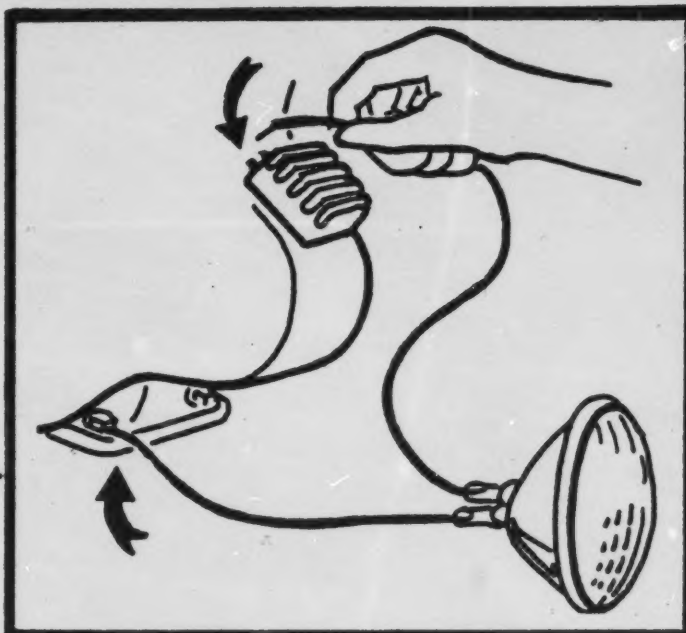
LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED FOR SHORTS BETWEEN THE STATOR AND GROUND.
2. CHECKED THE RECTIFIERS.
3. PUT ON THE FLYWHEEL AND KEY IN THE RIGHT WAY.
4. TORQUED THE NUT THE RIGHT AMOUNT.
5. PUT ON THE SHROUD OR COVER.

14. CONNECT THE SPARK PLUG WIRE.

15. HOOK UP THE LOAD LAMP. CONNECT ONE LEAD TO THE CHARGING TERMINAL ON THE RECTIFIER, THE OTHER TO THE BLOCK.



16. SET THE VOLT-OHMMETER TO "VOLTS". HOOK THE LEADS OF THE VOLT-OHMMETER ACROSS THE LOAD LAMP LEADS TO MEASURE THE VOLTAGE ON THE LAMP.



"TURN THE PAGE"

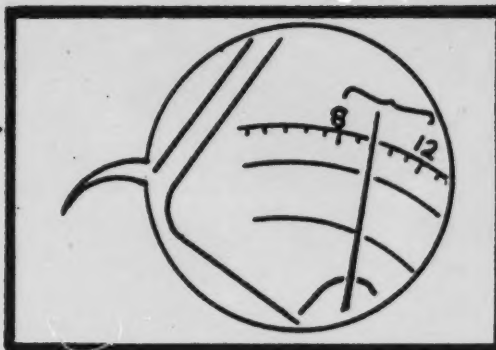
JOB STEPS

READ:

## 17. START THE ENGINE.

NOTE: THE LOAD LAMP SHOULD LIGHT, AND THE METER SHOULD SHOW FROM 8 TO 12 VOLTS. THIS DEPENDS ON ENGINE SPEED. (2400 TO 36PP RPM)

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. HOOKED UP THE LOAD LAMP.
2. MEASURED THE VOLTAGE OUTPUT FROM THE SYSTEM.

## 18. IF YOU DO NOT GET THE PROPER OUTPUT, CHECK THE WIRING.

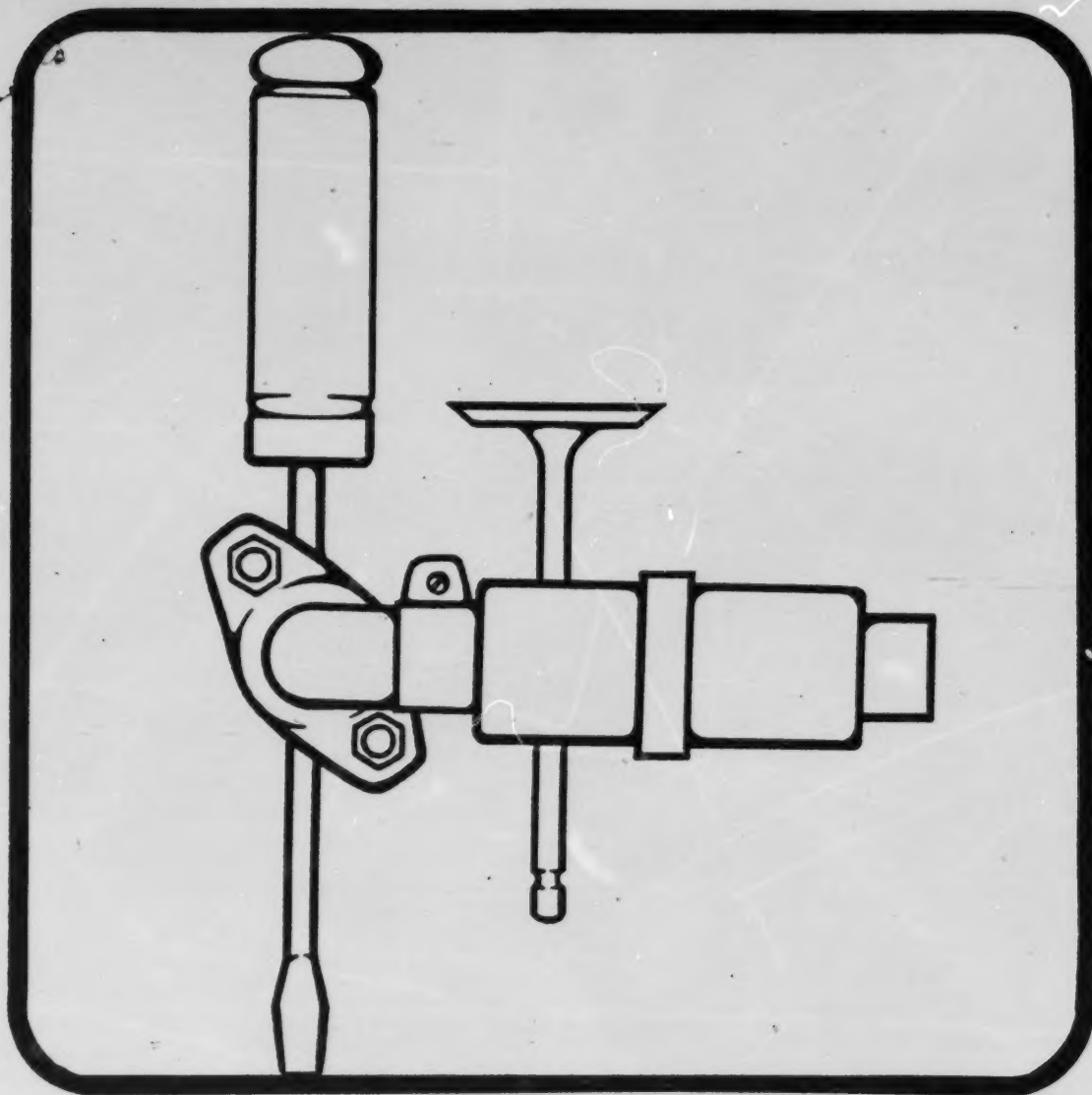
IF THE WIRING IS CORRECT, GO BACK TO JOB STEPS 7 AND 8 AND CHECK THE RECTIFIER AND STATOR.

## 19. IF ALL WORKS RIGHT, PUT AWAY ALL THE TOOLS AND THEN CLEAN UP YOUR WORK AREA.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. GOTTEN THE MACHINE TO WORK.
2. CLEANED UP THE WORK AREA.
3. PUT AWAY ALL TOOLS.



## small engine repair

unit: ELECTRICAL

capital area career center

module: 7501 06 003 1 7501 06 003 3 date: AUGUST 1977 level: II

skill title: REMOVE STARTER OR STARTER GENERATOR AND CHECK

developed & written by: DWIGHT SMITH

visuals by: DAVE WEHRWEIN

WORD GUIDE

STARTER GENERATOR - A STARTER  
THAT CHANGES INTO A GENERATOR  
AFTER THE ENGINE STARTS.

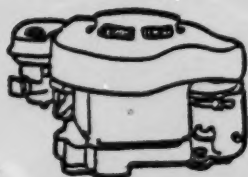
STARTER BENDIX OR STARTER DRIVE -  
A MOVING GEAR THAT ENGAGES  
TEETH ON THE ENGINE FLYWHEEL  
TO TURN THE ENGINE.

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

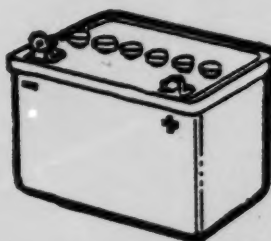
HOW TO REMOVE AND REPLACE THE STARTER OR STARTER-GENERATOR.

HOW TO CHECK AND REPLACE STARTER BRUSHES, BENDIX AND BELTS.

HOW TO TEST STARTER AND GENERATOR SYSTEM.

AND IN ORDER TO DO THIS YOU WILL NEED:

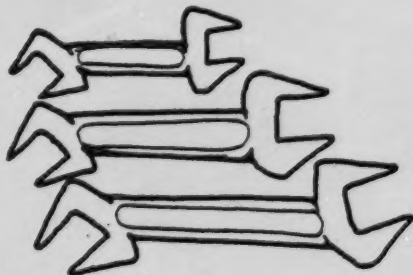
ENGINE WITH STARTER OR  
STARTER GENERATOR



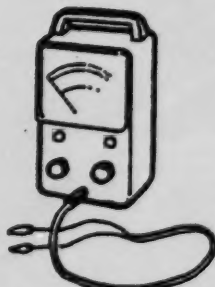
60R12 BATTERY  
OR 110 V



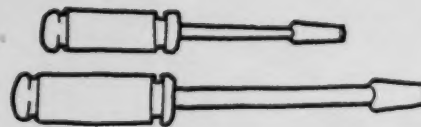
SOCKET  
SET



OPEN-END WRENCH SET



VOLT-OHMMETER



SCREWDRIVER SET

"TURN THE PAGE"





AC STARTER CORD

SERVICE MANUAL  
FOR ENGINE

SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

YOU HAVE CHECKED THE STARTING SYSTEM AND IT WORKS  
ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

"TURN THE PAGE"

JOB STEPSREAD:

1. TAKE ALL TOOLS, SUPPLIES AND EQUIPMENT TO YOUR WORK AREA.

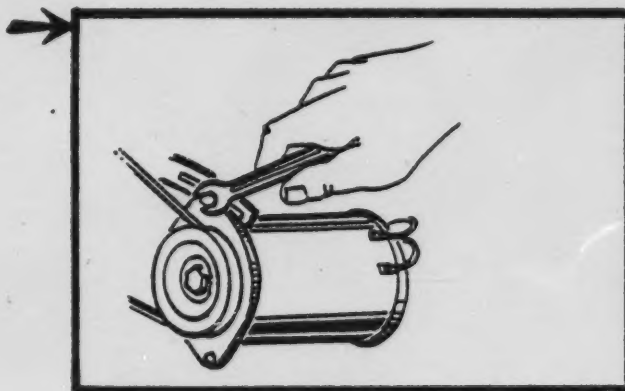
2. CHECK THE ENGINE NAME PLATE FOR THE MODEL AND SERIAL NUMBERS. THEN FIND THE SPECIFICATIONS OF THE STARTER OR STARTER GENERATOR FOR THE ENGINE ON WHICH YOU ARE WORKING. WHEN YOU HAVE FOUND THE SPECIFICATIONS, GO ON TO THE NEXT JOB STEP.

WEAR YOUR SAFETY GLASSESLOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. GATHERED THE TOOLS AND EQUIPMENT FOR THIS MOD.
2. FOUND THE SERIAL AND MODEL NUMBERS FROM THE ENGINE.
3. FOUND THE SPECIFICATIONS FOR THE STARTER OR STARTER-GENERATOR.

3. USING THE SOCKET SET AND SCREWDRIVERS, REMOVE THE STARTER OR STARTER-GENERATOR FROM THE ENGINE.



"TURN THE PAGE"

JOB STEPS

## READ:

4. CHECK THE STARTER BENDIX FOR SIGNS OF WEAR AND DAMAGE. LOOK FOR BENT OR LOOSE PARTS.

5. IF THE ENGINE HAS BELTS, CHECK THEM FOR:

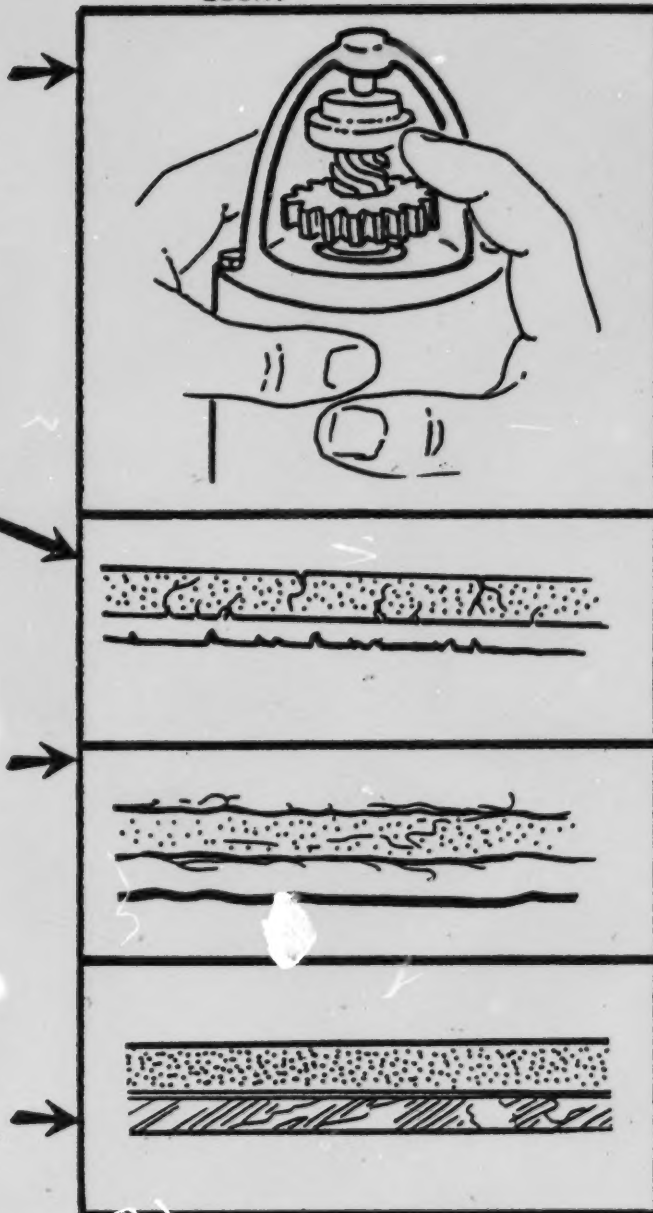
A. CRACKS

B. WEAR

C. GLAZE (A SHINY LOOK ON THE BELT).

ASK YOUR INSTRUCTOR TO CHECK FOR NEW BELTS, IF NEEDED.

## LOOK:



"TURN THE PAGE"

JOB STEPS

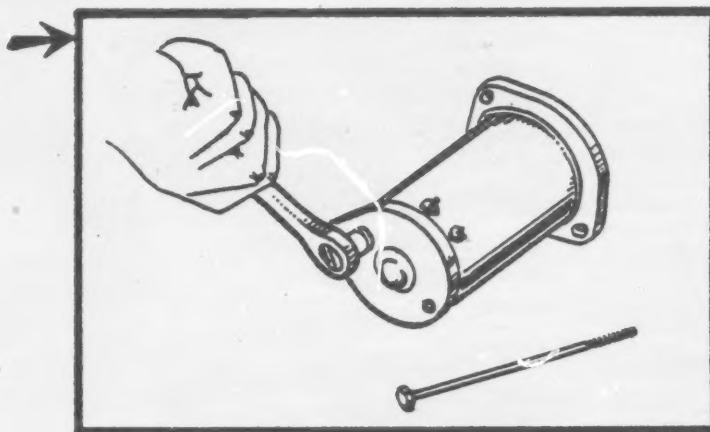
READ:

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE STARTER OR STARTER GENERATOR.
2. CHECKED THE BENDIX FOR WEAR AND DAMAGE.
3. CHECKED THE BELTS FOR WEAR AND DAMAGE.

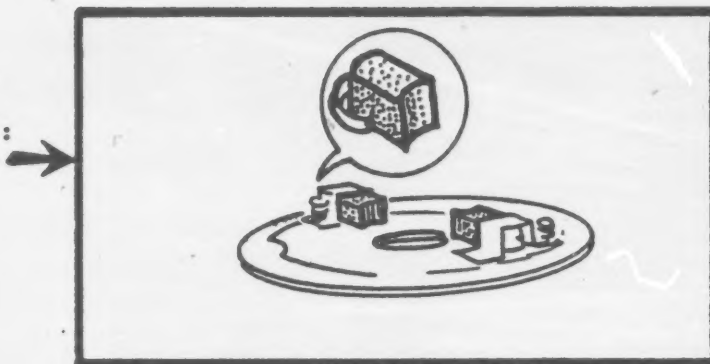
6. USING THE SOCKET SET, REMOVE THE BOLTS THAT GO THROUGH THE STARTER OR STARTER GENERATOR.



7. TAKE APART THE STARTER OR STARTER GENERATOR. LOOK AT THE PARTS VERY CAREFULLY SO YOU WILL BE ABLE TO PUT THEM BACK TOGETHER LATER. (SEE REPAIR MANUAL).

8. CHECK THESE PARTS FOR WEAR:

A. BRUSHES



"TURN THE PAGE"

WORD GUIDE

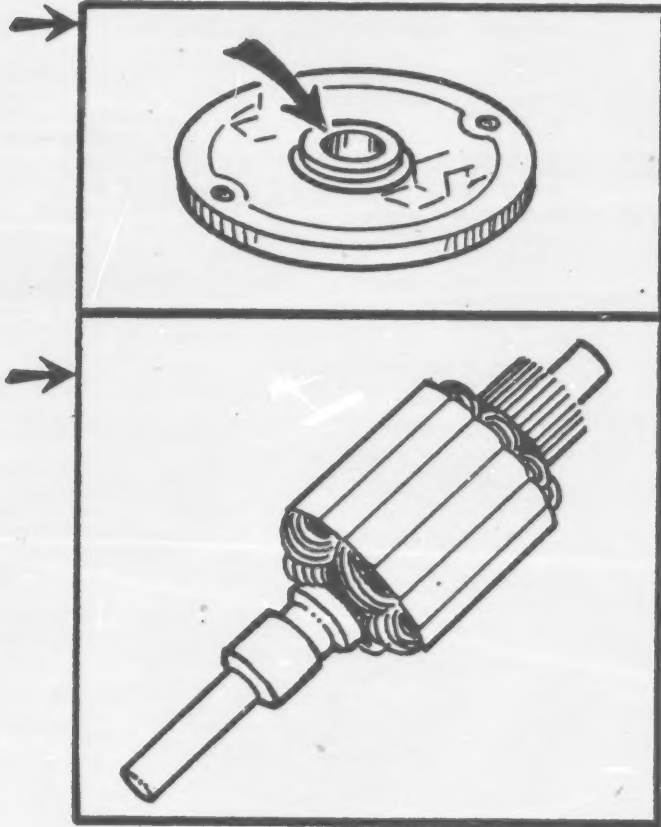
ARMATURE - THE PART OF THE MOTOR  
THAT SPINS.

JOB STEPS

READ:

B. BEARINGS

LOOK:



C. ARMATURE

IF ANY OF THE PARTS ARE  
WORN, ASK YOUR INSTRUCTOR IF  
THEY SHOULD BE REPLACED.

"TURN THE PAGE"

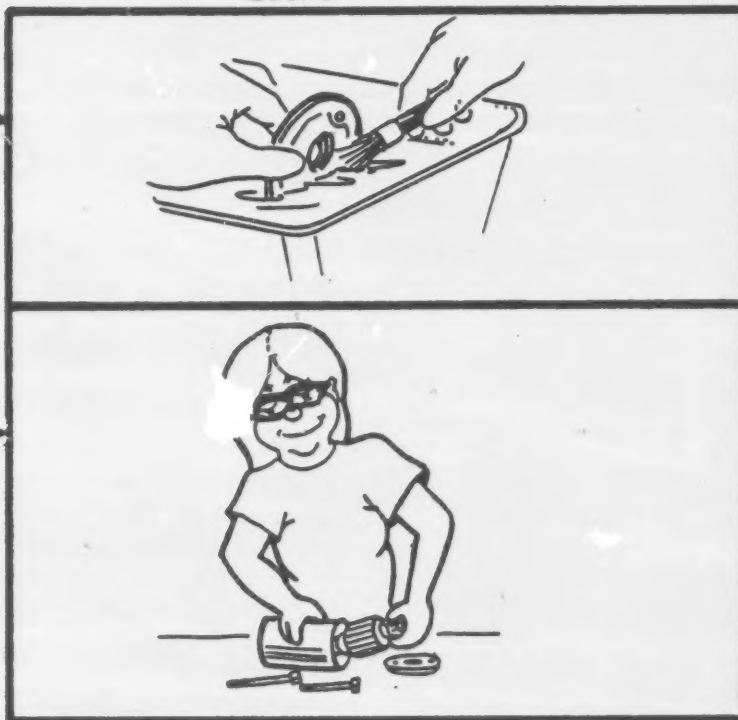


JOB STEPS

READ:

9. CAREFULLY CLEAN ALL THE PARTS AND DO NOT BREAK ANY OF THE WIRES.

LOOK:

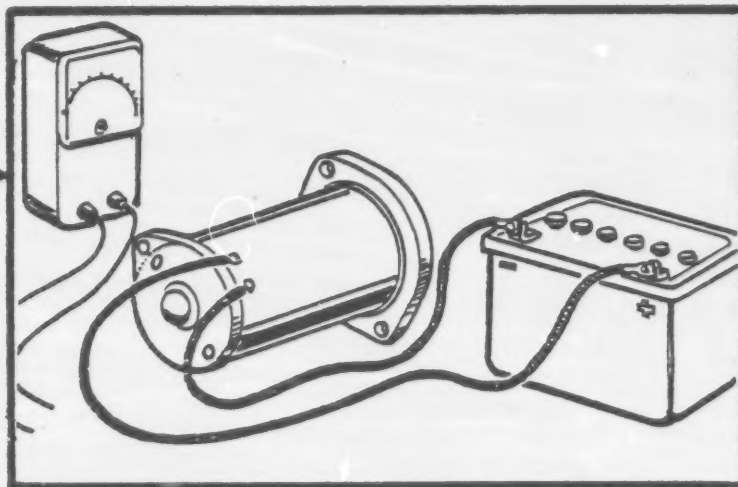


10. CAREFULLY PUT TOGETHER THE STARTER OR STARTER-GENERATOR.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN APART THE STARTER OR STARTER-GENERATOR.
2. CHECKED AND CLEANED ALL THE PARTS.
3. PUT THE STARTER OR STARTER-GENERATOR BACK TOGETHER CORRECTLY.

11. USING THE VOLT-OHMMETER AND BATTERY OR STARTER CORD, CHECK THE STARTER OR STARTER GENERATOR. SEE THE SERVICE AND REPAIR MANUAL FOR THE PROPER HOOKUP.



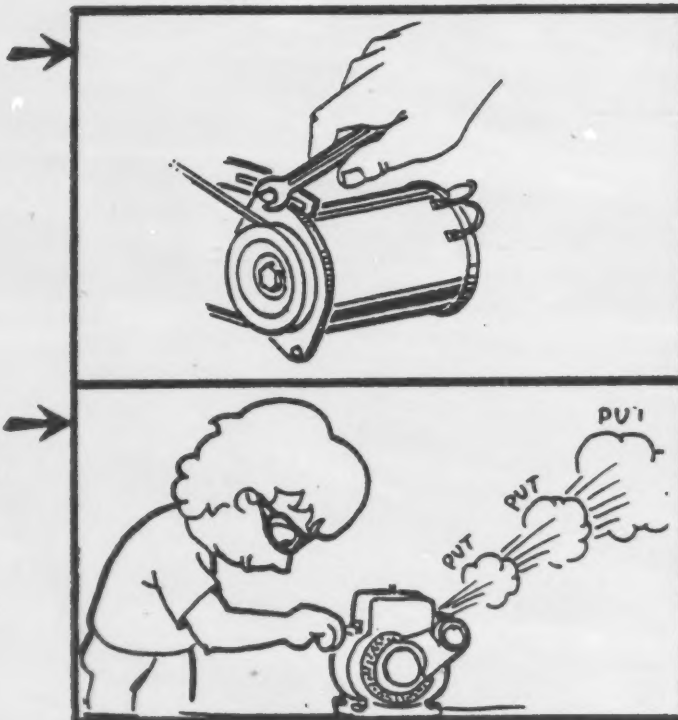
"TURN THE PAGE"

JOB STEPS

## READ:

12. USING THE SOCKET SET, WRENCHES AND SCREWDRIVERS, INSTALL THE STARTER OR STARTER-GENERATOR ON THE ENGINE. ADJUST BELTS, IF THEY ARE USED (SEE REPAIR MANUAL).

## LOOK:

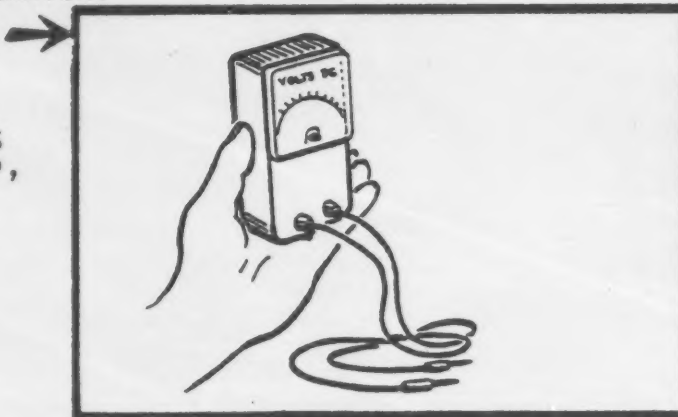


13. TRY TO START THE ENGINE. IF IT STARTS, GO ON TO THE NEXT STEP. IF THE STARTER DOES NOT TURN THE ENGINE, CHECK YOUR CONNECTIONS. IF IT STILL FAILS TO TURN, ASK YOUR INSTRUCTOR FOR HELP.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE STARTER OR STARTER-GENERATOR WITH VOLT-OHMMETER AND BATTERY OR STARTER CORD.
2. INSTALLED THE STARTER OR STARTER-GENERATOR CORRECTLY.
3. STARTED THE ENGINE WITH THE STARTER OR STARTER-GENERATOR.

14. USE THE VOLT-OHMMETER (SET TO "VOLTS") TO CHECK THE OUTPUT OF THE GENERATOR. SEE THE REPAIR MANUAL FOR SPECIFICATIONS AND ASK YOUR INSTRUCTOR FOR HELP, IF YOU NEED ANY.



"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

15. WHEN THE STARTER OR STARTER-GENERATOR IS WORKING CORRECTLY ACCORDING TO THE SERVICE MANUAL, CLEAN UP YOUR WORK AREA.

16. PUT AWAY ALL THE TOOLS IN THEIR PROPER PLACE.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE GENERATOR OUTPUT WITH A VOLT-OHMMETER.
2. CLEANED UP THE WORK AREA.
3. PUT AWAY ALL THE TOOLS AND EQUIPMENT.



## small engine repair

unit: ELECTRICAL

capital area career center

module: 7501 06 004 1 7501 06 004 3 date: 7/77 level:       

skill title: REMOVE, REPLACE AND INSTALL ELECTRICAL PARTS

developed & written by: DWIGHT SMITH

visuals by: DAVE WEHRWEIN

WORD GUIDE

TACHOMETER - A METER WHICH SHOWS  
ENGINE RPM (REVOLUTIONS OR TURNS  
PER MINUTE

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

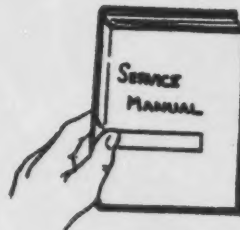
HOW TO REMOVE, REPLACE OR PUT IN ELECTRICAL PARTS SUCH  
AS:

- A. TACHOMETERS
- B. VOLTAMETERS
- C. LIGHTING SYSTEMS
- D. CIGARETTE LIGHTERS

THESE PARTS MAY OR MAY NOT BE PART OF THE FIRST  
MACHINE EQUIPMENT.

AND IN ORDER TO DO THIS YOU WILL NEED:

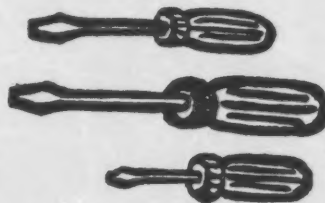
A MACHINE  
(RIDING MOWER, TRACTOR OR  
SNOWMOBILE, ETC.)



SERVICE MANUAL FOR MACHINE



SOCKET SET



SCREWDRIVER SET

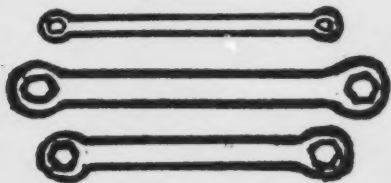


OPEN END WRENCH SET

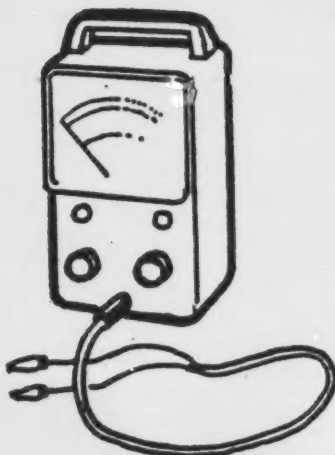
"TURN THE PAGE"



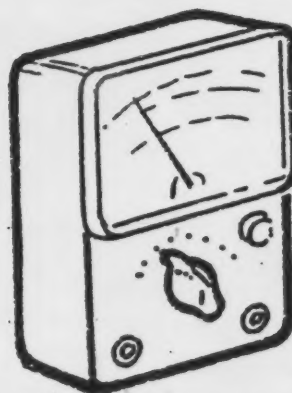
... YOU WILL NEED:



BOX END WRENCH SET



VOLTAMETER



3

ELECTRICAL PARTS  
(TACHOMETER, VOLTAMETER,  
CIGARETTE LIGHTER OR  
VOLT-AMMETER)

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE ALL THE EQUIPMENT.
2. YOU HAVE PUT IN OR REPLACED THE EQUIPMENT FOLLOWING SERVICE MANUAL SPECIFICATIONS.
3. YOU HAVE CLEANED YOUR WORK AREA AND PUT AWAY THE TOOLS IN THE RIGHT PLACES.

"TURN THE PAGE"

JOB STEPS

READ:

1. TAKE ALL YOUR EQUIPMENT, TOOLS AND SUPPLIES TO THE WORK AREA.



2. CHECK THE NAME PLATE ON THE MACHINE AND FIND THE SERIAL NUMBER AND MODEL NUMBER.



3. GET THE RIGHT SERVICE MANUAL FOR THE MACHINE AND READ THE ELECTRICAL SECTION TO FIND OUT WHAT KIND OF SYSTEM YOU ARE WORKING WITH:



- A. 6 VOLT
- B. 12 VOLT
- C. POSITIVE GROUND
- D. NEGATIVE GROUND



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

- A. ALL THE EQUIPMENT FOR THIS MOD.
- B. FOUND THE SERIAL NUMBER AND MODEL NUMBER.
- C. READ ABOUT THE ELECTRICAL SYSTEM FOR THIS MACHINE.
- D. FOUND OUT IF YOU WILL REPLACE A BROKEN PART OR PUT IN A NEW ONE.

NOTE: FOR A BROKEN ELECTRICAL PART, USE JOB STEPS 4 THROUGH 15. TO PUT IN A NEW ELECTRICAL PART, USE JOB STEPS 16 THROUGH 25.

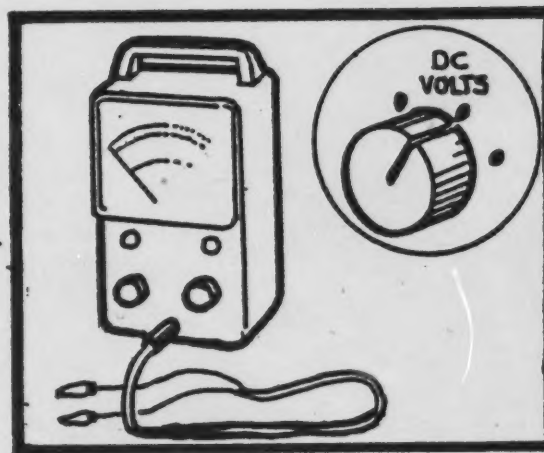
"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

4. SET THE VOLTAMETER TO "VOLT"  
AND START THE MACHINE'S ENGINE.



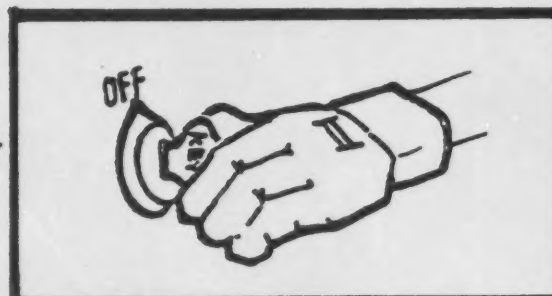
5. READ THE VOLTAGE FOR THE  
ELECTRICAL PART. LOOK UP THE  
PART IN THE SERVICE MANUAL SINCE  
THE MANUAL LISTS THE RIGHT  
VOLTAGE FOR EACH ELECTRICAL  
PART.



6. IF YOU FIND ZERO VOLTAGE,  
CHECK THE FUSES IN THE MACHINE.  
IF THE FUSES ARE OK, CHECK THE  
WIRING TO THE PART.



7. IF THE VOLTAGE IS OK, TURN  
OFF THE ENGINE.

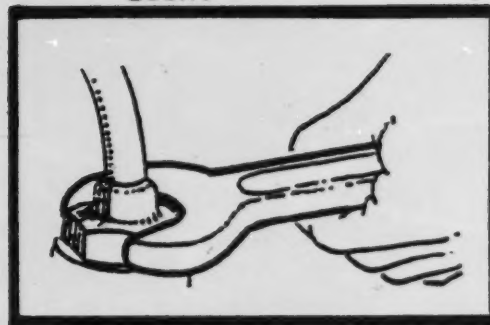


JOB STEPS

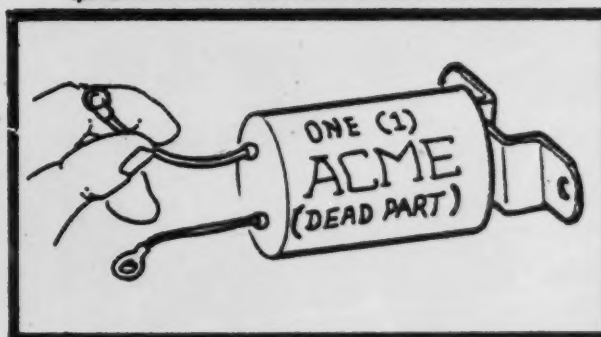
READ:

8. USING THE RIGHT OPEN-END WRENCH, TAKE OFF THE BATTERY CABLES.

LOOK:



9. USING THE RIGHT OPEN-END WRENCH, REMOVE THE WIRES TO THE BROKEN ELECTRICAL PART.



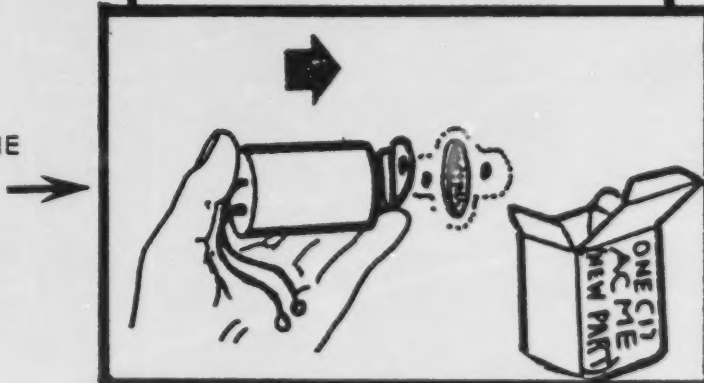
CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK. BE SURE YOU HAVE:

- A. CHECKED THE VOLTAGE TO THE ELECTRICAL PART.
- B. TAKEN OFF THE BATTERY CABLES.

10. USING THE RIGHT OPEN-END WRENCH, REMOVE THE BROKEN ELECTRICAL PART.



11. FIT THE NEW PART INTO THE HOLE LEFT BY THE OLD ONE.

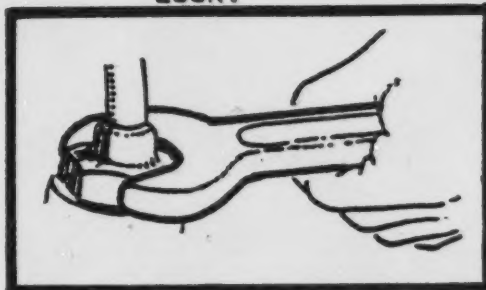


"TURN THE PAGE"

JOB STEPS

READ:

12. USE THE OPEN END WRENCH TO  
PUT IN THE NEW PART.



LOOK:

13. HOOK UP THE WIRES. CHECK  
THE SERVICE MANUAL FOR THE  
RIGHT HOOK UP.



CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK. YOUR  
INSTRUCTOR WILL CHECK:

- A. THE PART YOU REMOVED.
- B. THE WAY YOU PUT IN THE NEW PART (NEATNESS  
COUNTS!)
- C. RIGHT HOOK-UP OF THE WIRES.

14. CONNECT THE BATTERY WIRES.  
THEN, START THE MACHINE'S ENGINE.



15. CHECK HOW WELL  
THE NEW ELECTRICAL PART WORKS.

"TURN THE PAGE"



JOB STEPSTO PUT IN A NEW PART

READ:

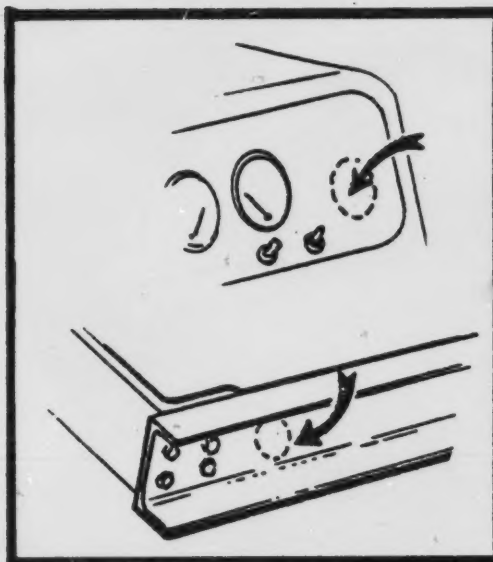
16. FIND A PLACE ON THE MACHINE  
 WHERE YOU CAN PUT THE PART  
 SO THAT:

A. IT DOES NOT STOP OR CHANGE  
 THE WAY ANY OTHER PARTS WORK.

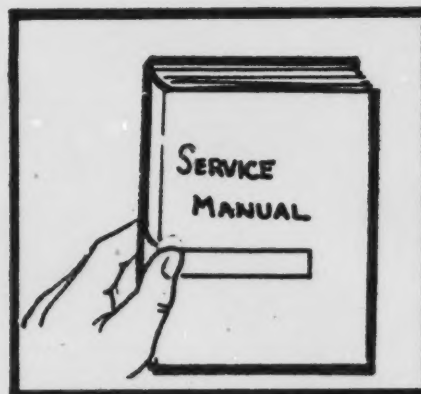
B. IT CAN BE USED OR SEEN  
 BY THE PERSON USING THE  
 MACHINE.

17. TAKE OFF THE BATTERY CABLES.

LOOK:

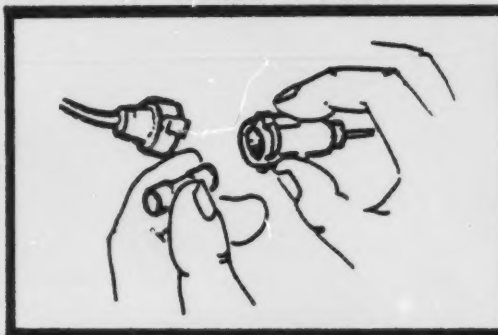


18. CHECK THE MACHINE'S MANUAL  
 FOR THE RIGHT PLACE IN THE  
 ELECTRICAL CIRCUIT TO HOOK UP  
 THE PART.



CHECK: ASK YOUR INSTRUCTOR IF THE PLACE YOU FOUND  
 IS CORRECT AND IF THE PART NEEDS A FUSE.

19. IF THE PART NEEDS A  
 FUSE, CONNECT IT TO THE WIRE  
 GOING TO THE NEW PART.



"TURN THE PAGE"

JOB STEPS

READ:

20. USING THE SCREWDRIVER SET  
AND THE OPEN-END WRENCH SET,  
PUT THE PART ON THE MACHINE.

LOOK:

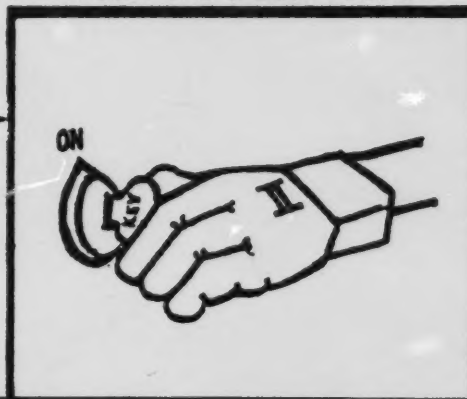


21. HOOK-UP THE WIRES. CHECK  
THE SERVICE MANUAL AND/OR THE  
INSTRUCTIONS THAT CAME WITH THE  
PART FOR THE RIGHT HOOK-UP.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THE ELECTRICAL  
HOOK-UP WITH YOU.

22. CONNECT THE BATTERY WIRES.  
THEN, START THE MACHINE'S ENGINE.



23. CHECK THE PART TO SEE  
IF IT IS WORKING RIGHT. IF  
THE PART WORKS CORRECTLY,  
GO ON TO THE NEXT JOB STEP. IF  
IT DOES NOT WORK, CHECK YOUR WORK.



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"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

24. CHECK THE FUSE AND THE WIRING.  
IF IT STILL FAILS TO WORK, ASK  
YOUR INSTRUCTOR FOR HELP.



25. NOW CLEAN UP YOUR WORK AREA.  
REMEMBER TO PUT AWAY ALL THE TOOLS  
IN THE RIGHT PLACES.



CHECK: ASK YOUR INSTRUCTOR TO CHECK YOUR WORK. YOUR  
INSTRUCTOR WILL CHECK TO SEE THAT YOU HAVE:

- A. CONNECTED THE PART SO THAT IT WORKS.
- B. PUT IN THE PART NEATLY.
- C. CLEANED YOUR WORK AREA AND STORED TOOLS  
IN THE RIGHT PLACE.



## small engine repair

unit: MAGNETIC SYSTEMS

capital area career center

module: 7501 08 002 1  
7501 08 002 3 date: SEPT 77 level: II

skill title: REMOVE, REPLACE AND CHECK FLYWHEEL, POINTS,  
CONDENSER AND COIL

developed & written by: DWIGHT SMITH AND DENNIS PARKER

visuals by: DAVE WEHRWEIN

WORD GUIDE

MAGNETO - A PART WHICH FIRES A  
SPARK PLUG AND NEEDS NO BATTERY  
TO WORK

IMPACT NUT - USED TO REMOVE FLYWHEEL  
WHEN YOU DON'T HAVE A PULLER

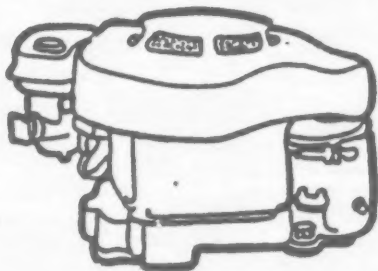
B & S - BRIGGS AND STRATTON

TORQUE - TWISTING FORCE

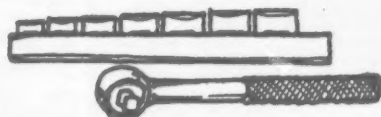
PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REMOVE AND CHECK THE FLYWHEEL AND ALL MAGNETO PARTS  
(INCLUDING THE COIL, CONDENSER, BREAKER POINTS, POINTS CAM,  
AND BREAKER HOUSING DUST COVER).

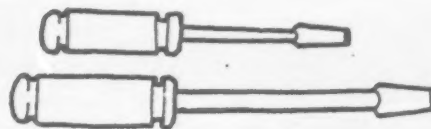
HOW TO PUT THE PARTS BACK INTO THE ENGINE SO IT RUNS  
SMOOTHLY.

AND IN ORDER TO DO THIS YOU WILL NEED:

AN ENGINE



SOCKET SET



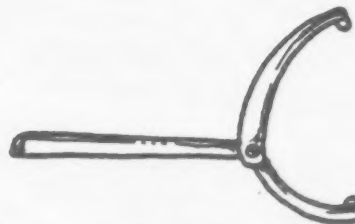
SCREWDRIVER SET



TORQUE WRENCH



COIL-CONDENSER TESTER



FLYWHEEL PULLER  
OR IMPACT NUT



... YOU WILL NEED:

SPECIAL B & S TOOLS



SERVICE MANUAL FOR ENGINE



FEELER GAUGES



SAFETY GLASSES

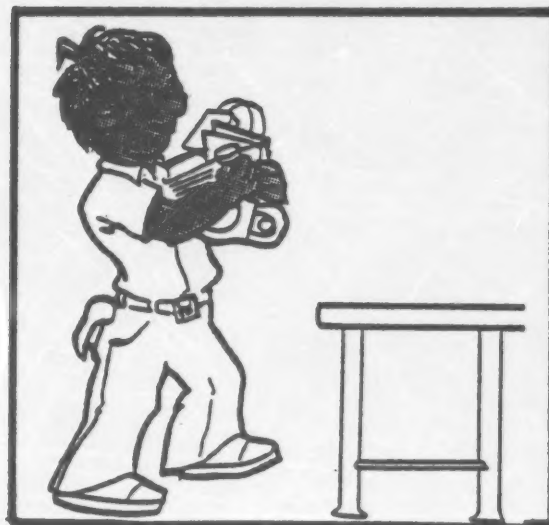
WE WILL KNOW THAT YOU CAN DO IT WHEN:

1. YOU HAVE ALL EQUIPMENT FOR THIS MOD.
2. YOU HAVE REMOVED AND REPLACED THE MAGNETO PARTS.
3. THE ENGINE CAN "JUMP A SPARK" .166 INCHES ON THE TESTER.
4. THE ENGINE STARTS AND RUNS SMOOTHLY, TO MANUAL SPECIFICATIONS.

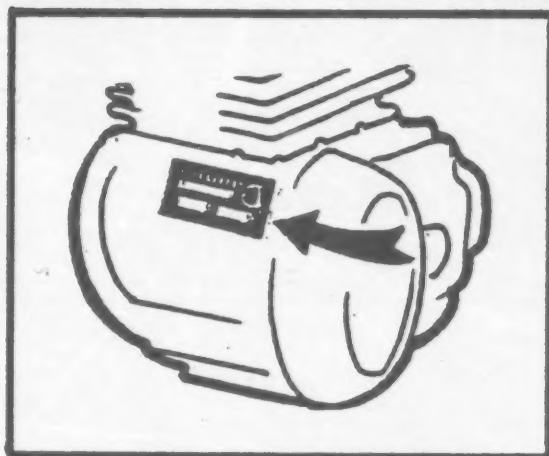
"TURN THE PAGE"

JOB STEPSREAD:

1. TAKE ALL EQUIPMENT AND MATERIALS TO YOUR WORK AREA.

LOOK:

2. FIND THE ENGINE SERIAL NUMBER AND MODEL. BE SURE YOU HAVE THE RIGHT SERVICE MANUAL.



3. READ THE SERVICE MANUAL SECTION ON THE IGNITION SYSTEM.

4. READ THE SMALL ENGINE SERVICE MANUAL PAGES 21 TO 25. BE SURE YOU KNOW HOW THE POINTS, CONDENSER AND COIL WORK TO MAKE A SPARK.



WORD GUIDE

BLOWER SHROUD - SHEET METAL WHICH GOES  
OVER THE FLYWHEEL

READ:

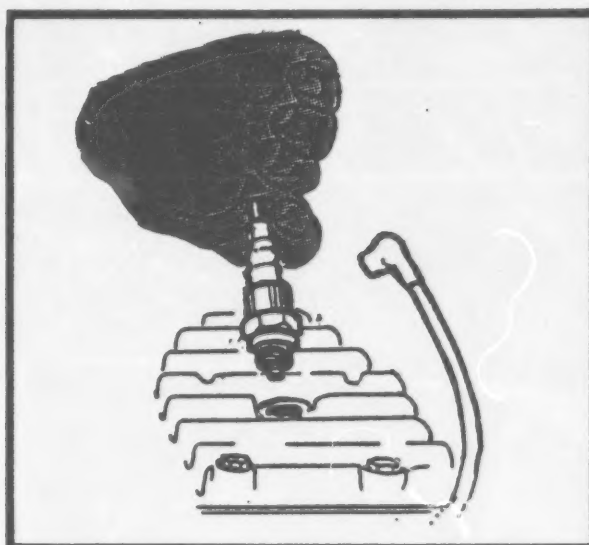
LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

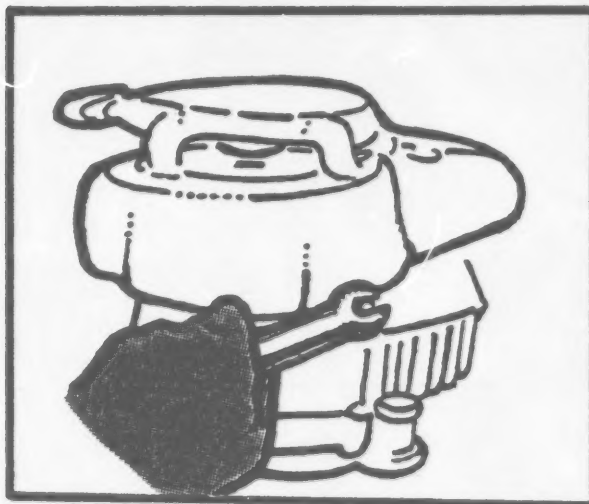
1. ALL THE EQUIPMENT FOR THIS MOD.
2. FOUND THE SERIAL NUMBER AND THE MODEL OF THE ENGINE.
3. READ AND LEARNED ABOUT THE IGNITION SYSTEM.

WEAR YOUR SAFETY GLASSES

5. USE A SPARK PLUG SOCKET TO REMOVE THE SPARK PLUG.

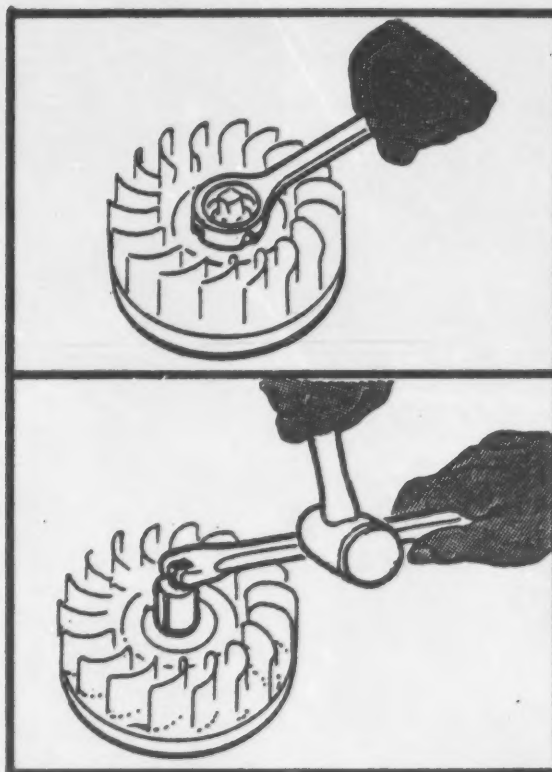


6. USE A SCREWDRIVER OR WRENCH TO REMOVE THE BLOWER SHROUD.



JOB STEPSREAD:

7. USE THE RIGHT WRENCH OR SOCKET TO REMOVE THE FLYWHEEL NUT OR STARTER CLUTCH.

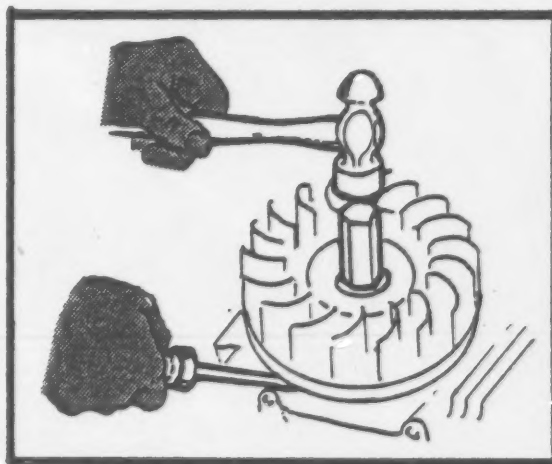
LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE SPARK PLUG.
2. TAKEN OFF THE SHROUD.
3. REMOVED THE FLYWHEEL NUT OR STARTER CLUTCH.

8. USE THE RIGHT PULLER OR IMPACT NUT TO REMOVE THE FLYWHEEL. CHECK THE B & S MANUAL AND ASK YOUR INSTRUCTOR FOR HELP WITH THIS.

NOTE: BE SURE TO GET HELP IF YOU NEED IT - THE FLYWHEEL CAN BE BROKEN



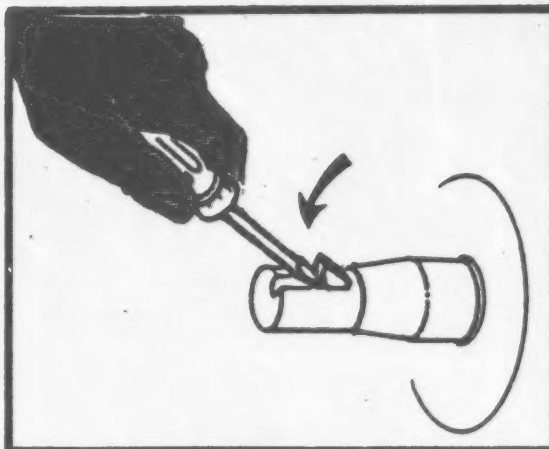
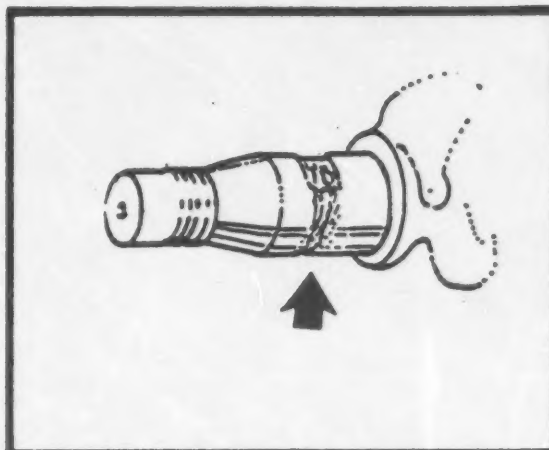
"TURN THE PAGE"

JOB STEPSREAD:

9. LOOK CLOSELY AT THE FLYWHEEL. LOOK FOR RUBBING, CRACKS, OR DAMAGE. ALSO CHECK THE CRANKSHAFT END FOR DAMAGE TO THE KEYWAY.

10. USE A SCREWDRIVER TO REMOVE THE KEY.

11. CHECK THE KEY FOR WEAR. IF IT IS O.K., PUT IT BACK IN. IT SHOULD FIT TIGHTLY.

LOOK:

"TURN THE PAGE"



DENTS - PARTS WHICH HAVE BEEN  
PUSHED IN

READ: JOB STEPS

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE FLYWHEEL PROPERLY.
2. CHECKED THE FLYWHEEL FOR DAMAGE.
3. REMOVED, CHECKED AND REPLACED THE KEY.

12. USE A SCREWDRIVER OR  
WRENCH TO REMOVE THE BREAKER  
POINTS DUST COVER.



13. CHECK THE COVER FOR DENTS  
OR WEAR.



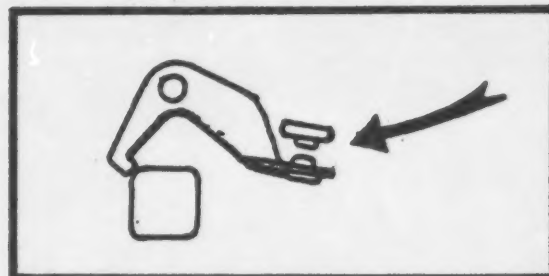
"TURN THE PAGE"

READ:

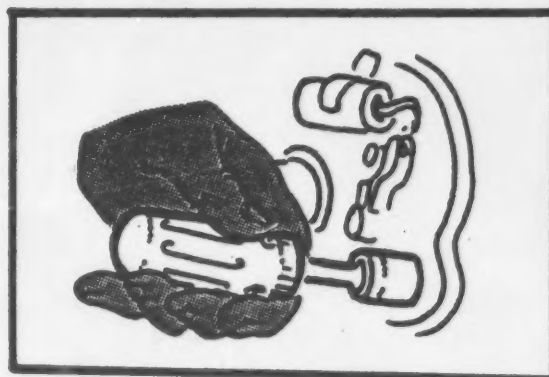
JOB STEPS

LOOK:

14. TURN THE CRANKSHAFT TO SEE IF THE POINTS ARE OPENING. LEAVE IT WHERE THE POINTS ARE OPEN.



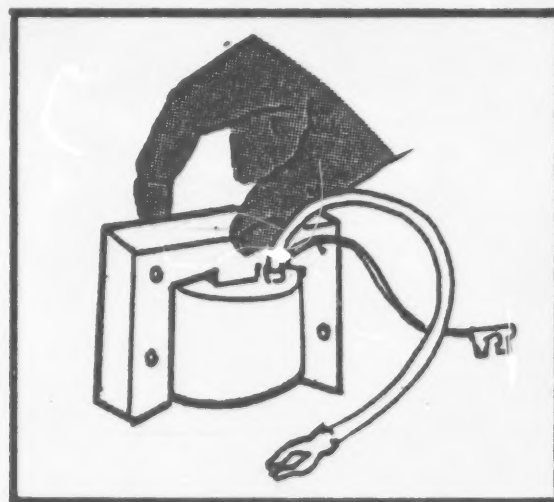
15. TAKE OUT THE POINTS AND CONDENSER. BE CAREFUL WITH THE WIRES.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE DUST COVER AND CHECKED IT FOR DENTS AND WEAR.
2. OPENED THE POINTS AND REMOVED THEM, AS WELL AS THE CONDENSER.

16. TAKE OUT THE COIL.



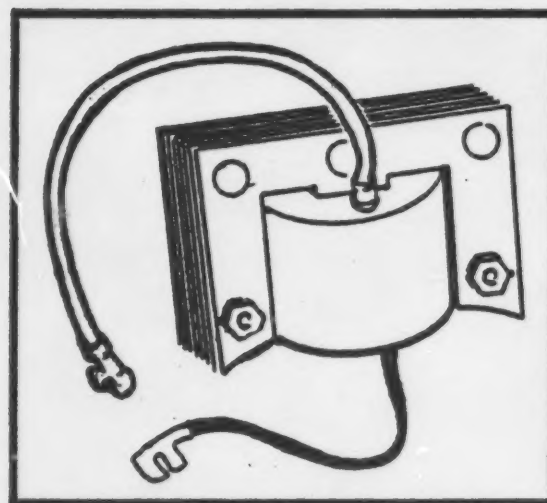
"TURN THE PAGE"

READ:

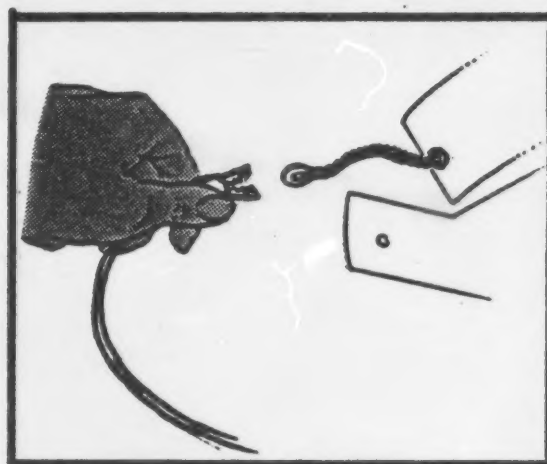
JOB STEPS

LOOK:

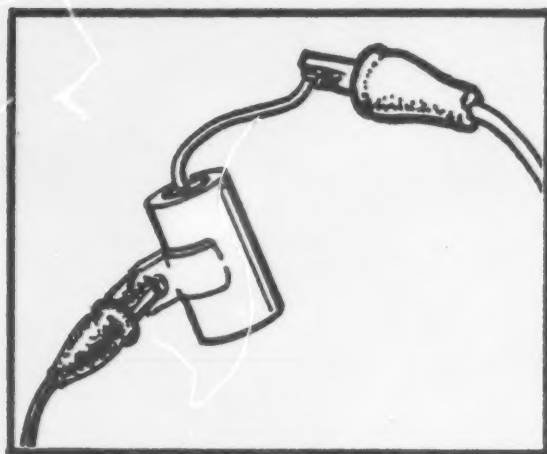
17. CHECK THE WIRES FOR RUBBING AND WEAR. IF COIL IS BAD, ASK YOUR INSTRUCTOR FOR A NEW ONE.



18. TEST THE COIL, LIKE YOU DID IN MODS 7501 13 002 1  
7501 13 002 3  
AND 7501 13 003 1  
7501 13 003 3



19. TEST THE CONDENSER WITH THE COIL CONDENSER TESTER, LIKE YOU DID IN MOD. 7501 13 001 1  
7501 13 001 3.



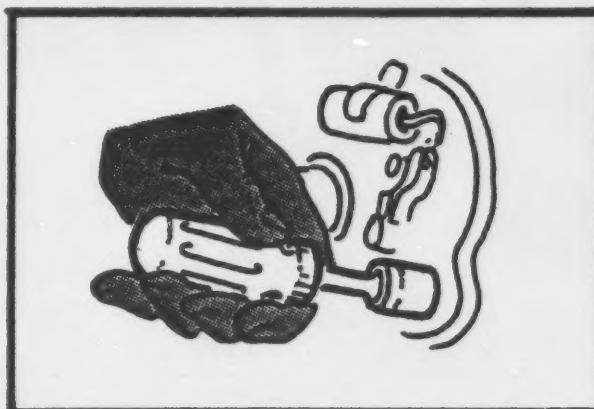
"TURN THE PAGE"

JOB STEPSREAD:LOOK:

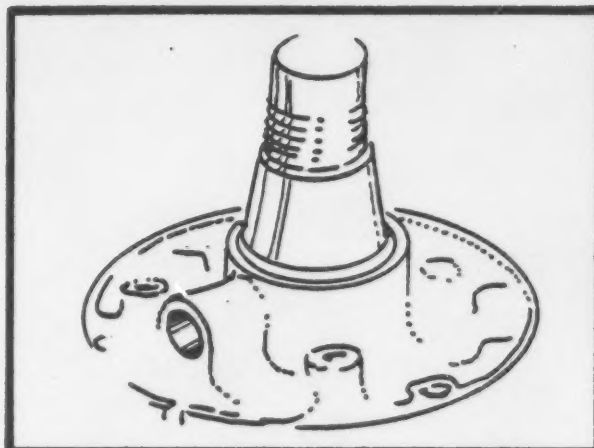
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OUT THE COIL AND CHECKED IT.
2. TAKEN OUT THE CONDENSER AND TESTED IT.

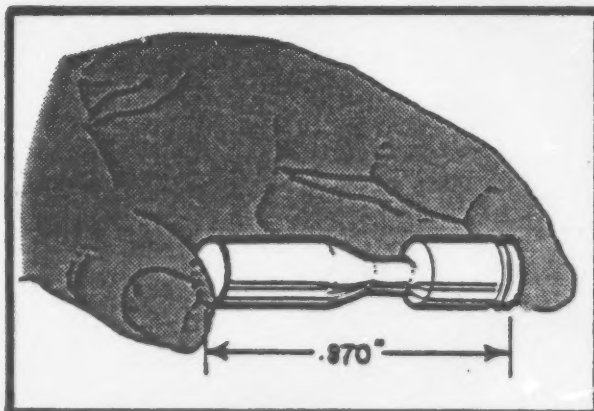
20. IF THE CONDENSER IS OK, PUT IT BACK IN. IF NOT, GIVE IT TO YOUR INSTRUCTOR AND GET A NEW ONE. TEST THE NEW ONE BEFORE PUTTING IT IN.



21. LOOK AT THE BREAKER POINT CAM (IF YOU CAN). CHECK FOR DIRT AND CRACKS. BE SURE IT IS IN THE RIGHT WAY.



22. CHECK THE PLUNGER FOR WEAR AND RIGHT LENGTH. IT MUST BE AT LEAST .870 INCHES LONG.



WORD GUIDEPITTING - SMALL HOLES OR PITSJOB STEPS

READ:

LOOK:

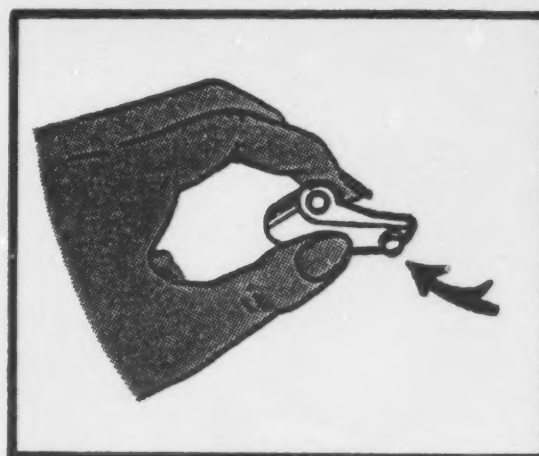
23. PUT IN THE PLUNGER SO THE OIL GROOVE IS AT THE TOP.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REPLACED THE CONDENSER.
2. CHECKED THE BREAKER CAM.
3. CHECKED AND PUT IN THE PLUNGER.

24. CHECK THE POINTS FOR BURNING AND PITTING. IF THEY ARE BAD, GET A NEW SET FROM YOUR INSTRUCTOR.



"TURN THE PAGE"



READ:

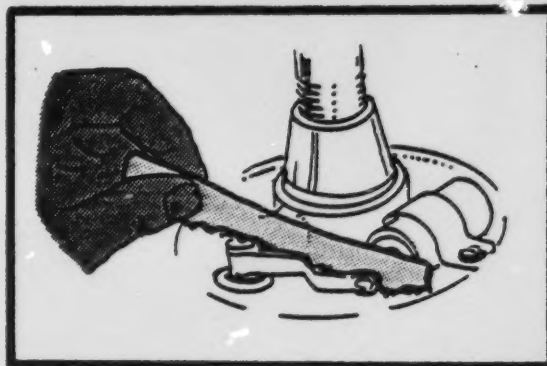
JOB STEPS

LOOK:

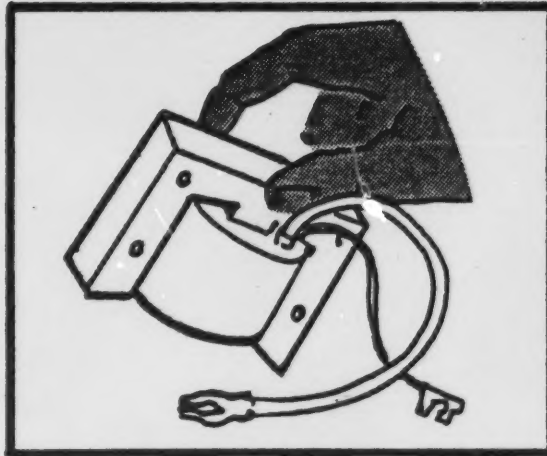
25. PUT THE NEW POINTS IN THE ENGINE AND SET THEM TO THE RIGHT SIZE GAP (LOOK UP THE SIZE IN THE MANUAL).



26. TURN THE CRANKSHAFT UNTIL THE POINTS CLOSE. IF THEY ARE THE OLD ONES, PULL A STRIP OF NOTEBOOK PAPER BETWEEN THEM TO CLEAN THEM.



27. PUT THE COIL BACK IN THE ENGINE.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED AND REPLACED THE POINTS AS NEEDED.
2. PUT IN AND GAPPED THE POINTS PROPERLY.
3. CLEANED OLD POINTS, IF USED.

READ:

JOB STEPS

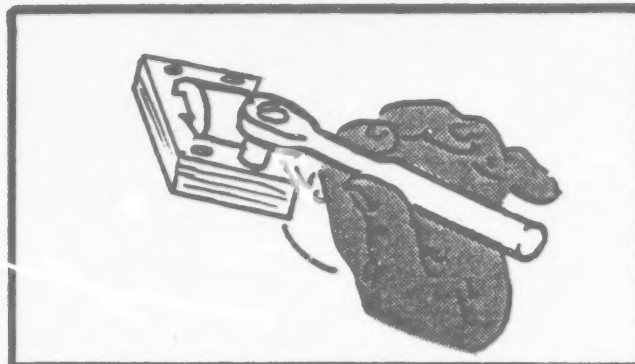
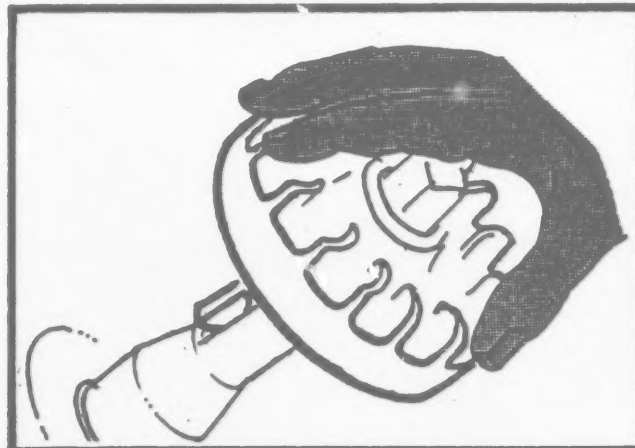
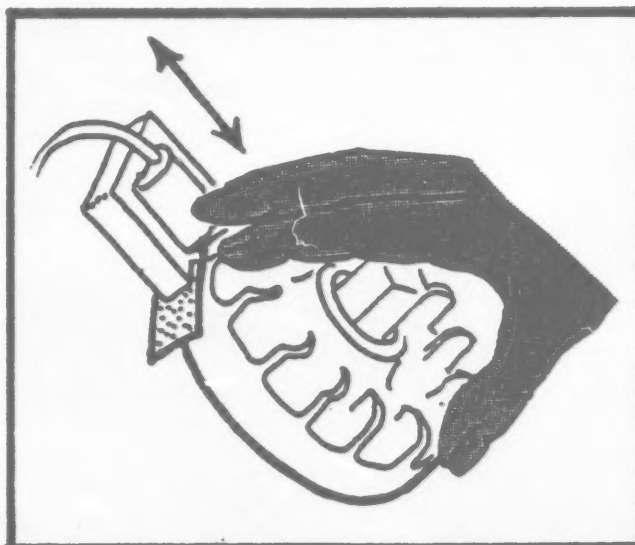
LOOK:

28. IF THE COIL IS UNDER THE FLYWHEEL, THE GAP CANNOT BE SET. IF THE COIL MOUNTS OVER THE FLYWHEEL, YOU MUST SET THE AIR GAP.

29. HOOK UP THE WIRES.

30. PUT IN THE KEY AND FLYWHEEL.

31. PUT IN THE COIL. PULL IT AWAY FROM THE FLYWHEEL AND TIGHTEN ONE OF THE HOLD-DOWN SCREWS.



"TURN THE PAGE"

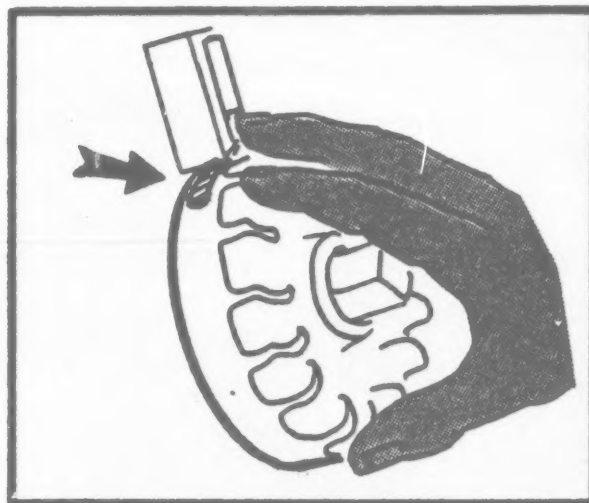
READ:

JOB STEPS

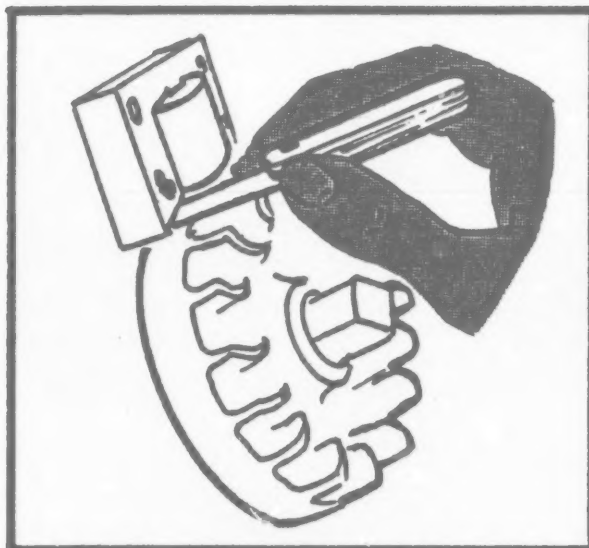
LOOK:

## 32. GAP THE COIL.

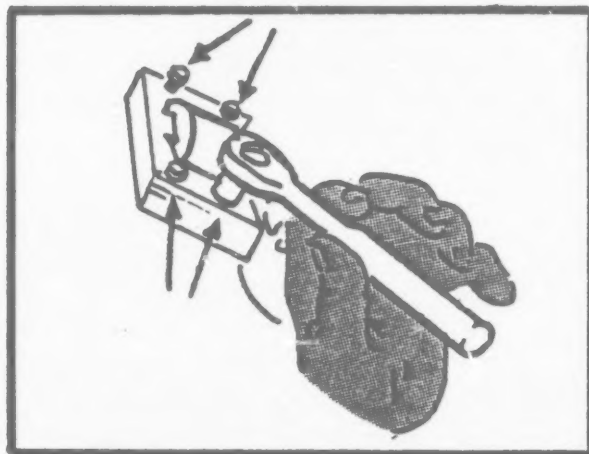
- A. TURN THE FLYWHEEL UNTIL THE MAGNETS ARE POINTED TOWARD THE COIL.



- B. PUT A FEELER GAUGE OF THE RIGHT THICKNESS (.010 UNLESS THE MANUAL SAYS DIFFERENT) BETWEEN THE COIL AND THE FLYWHEEL



- C. LOOSEN THE COIL HOLD-DOWN SCREW AND LET THE COIL SLIP TOWARD THE FLYWHEEL.



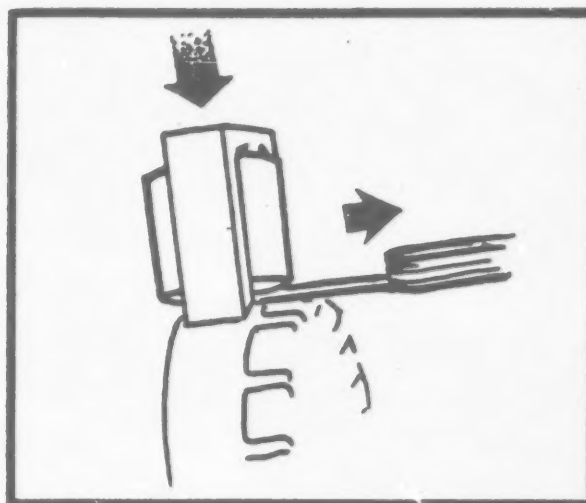
"TURN THE PAGE"

READ:

JOB STEPS

LOOK:

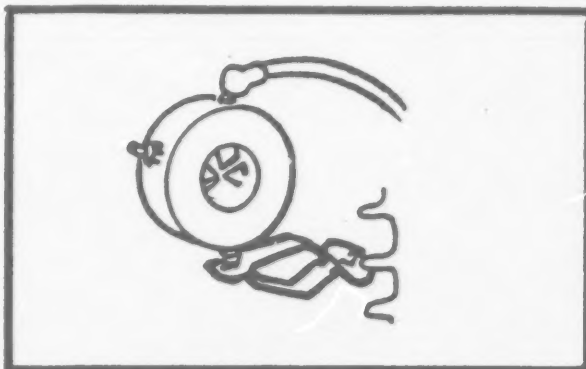
32. D. TIGHTEN THE HOLD-DOWN SCREWS AND TAKE OUT THE FEELER GAUGE.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

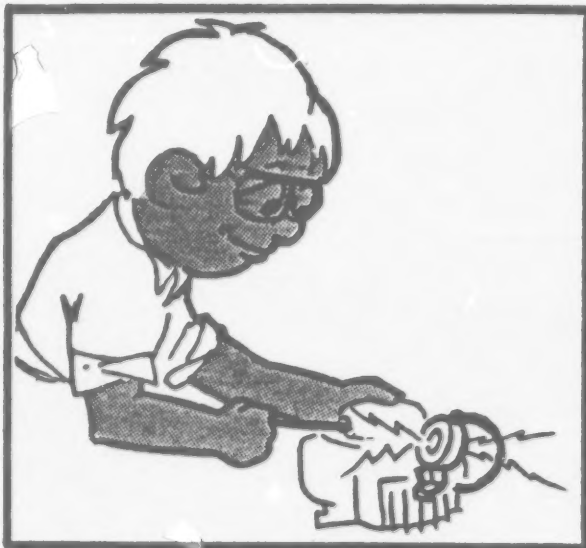
1. PUT IN THE COIL.
2. PUT IN THE FLYWHEEL AND TORQUED IT PROPERLY.
3. SET THE COIL GAP IF NEEDED.

33. HOOK THE PLUG WIRE UP TO THE B & S SPARK TESTER. (SEE B & B REPAIR MANUAL, SECTION 3, PAGE 1).



34. SPIN THE FLYWHEEL IN THE RIGHT DIRECTION. WATCH THE SPARK.

- A. A BLUE OR ORANGE SPARK IS GOOD.
- B. A YELLOW SPARK IS NOT GOOD. DO THE STEPS AGAIN IF THE SPARK IS STILL YELLOW, CHECK YOUR WORK AND TRY AGAIN.



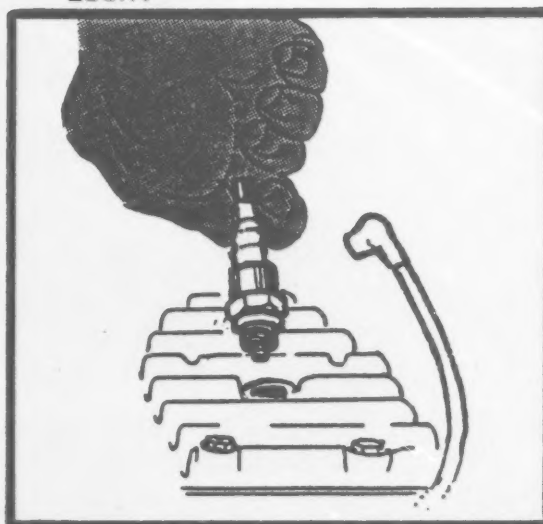
"TURN THE PAGE"

JOB STEPS

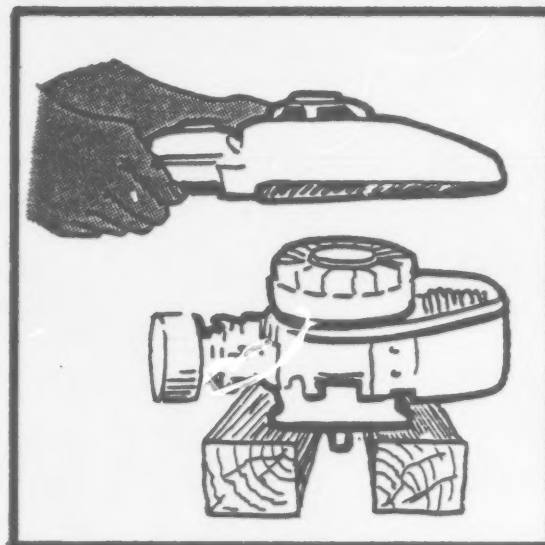
READ:

35. PUT THE SPARK PLUG BACK  
IN THE ENGINE AND HOOK IT UP.

LOOK:



36. PUT THE BLOWER SHROUD BACK  
ON WITH A SCREWDRIVER OR WRENCH.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE SPARK WITH THE TESTER.
2. REPLACED THE SPARK PLUG.
3. PUT THE BLOWER SHROUD BACK ON.

37. CHECK THE ENGINE OIL LEVEL,  
AND ADD OIL IF NEEDED.

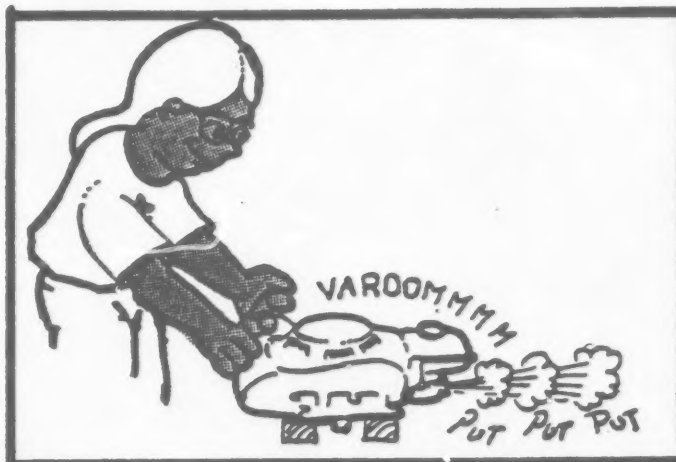


JOB STEPS

READ:

LOOK:

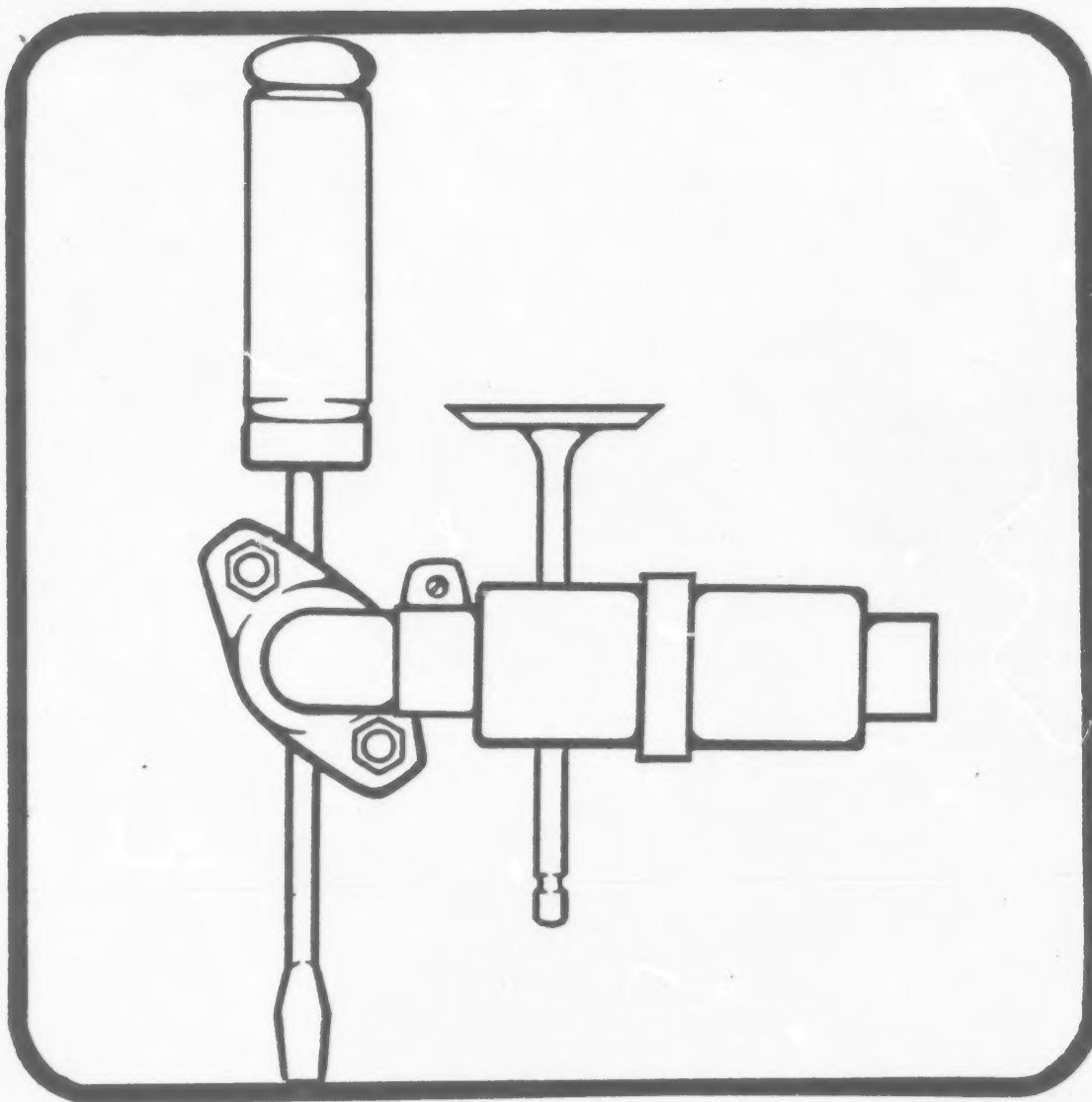
38. START THE ENGINE AND CHECK IT OUT. BE SURE IT WORKS SMOOTHLY.



39. IF THE ENGINE RUNS PROPERLY, PUT THE TOOLS AWAY AND CLEAN UP THE WORK AREA.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT:

1. THE ENGINE STARTS UP QUICKLY AND RUNS SMOOTHLY.
2. YOU HAVE CLEANED UP THE WORK AREA AND PUT AWAY TOOLS.



## small engine repair

unit: MAGNETIC SYSTEMS

capital area career center

module: 7501 08 003 1 7501 08 003 3 date: OCTOBER 1977 level: II

skill title: REMOVE AND REPLACE ARMATURE PLATE ASSEMBLY  
AND RE-TIME TECUMSEH ENGINE

developed & written by: ALAN STEINBERG

visuals by: DAVE WEHRWEIN

WORD GUIDE

ARMATURE PLATE ASSEMBLY - SIDE COVER OF ENGINE WHICH HOLDS MAGNETO ASSEMBLY. FOUND UNDER FLYWHEEL

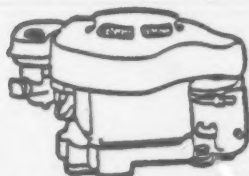
DIAL INDICATOR - SHOWS WHERE ENGINE PISTON IS

REMOVE - TAKE OUT

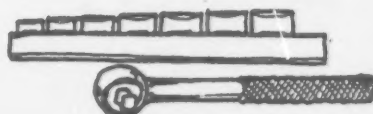
REPLACE - CHANGE, PUT BACK

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

1. HOW TO REMOVE, CHECK AND REPLACE THE ARMATURE PLATE ASSEMBLY.
2. HOW TO RE-TIME ARMATURE PLATE ASSEMBLY TO ENGINE USING A DIAL INDICATOR AND A CONTINUITY LIGHT.

AND IN ORDER TO DO THIS YOU WILL NEED:

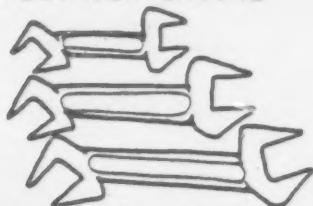
TECUMSEH ENGINE



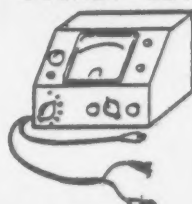
SOCKET SET



DIAL INDICATOR



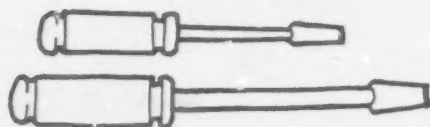
OPEN-END WRENCH SET



MERCOTRONIC TESTER



FEELER GAUGE SET



SCREWDRIVER SET

FLYWHEEL PULLER  
OR IMPACT NUT

CONTINUITY LIGHT



SAFETY GLASSES

"TURN THE PAGE"

WORD GUIDEGUIDELINES - RULESWE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE ALL YOUR EQUIPMENT.
2. YOU HAVE OPENED THE POINTS TO THE SERVICE MANUAL GUIDELINES.

"TURN THE PAGE"

JOB STEPS

## READ:

1. GET ALL YOUR EQUIPMENT AND TAKE IT TO YOUR WORK AREA.

2. READ "SPARK PLUG SERVICING" IN SMALL ENGINE SERVICE MANUAL, PAGE 24, SO YOU CAN CHECK THE ENGINE BY LOOKING AT THE SPARK PLUG.

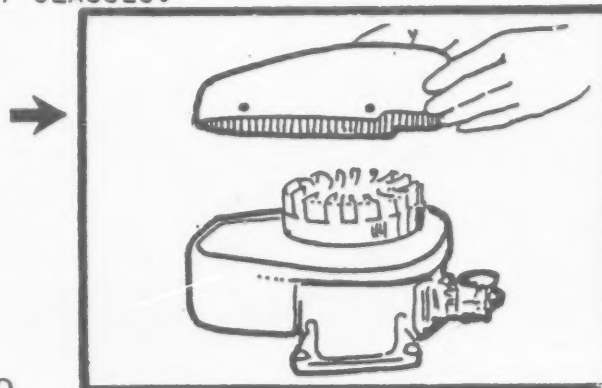
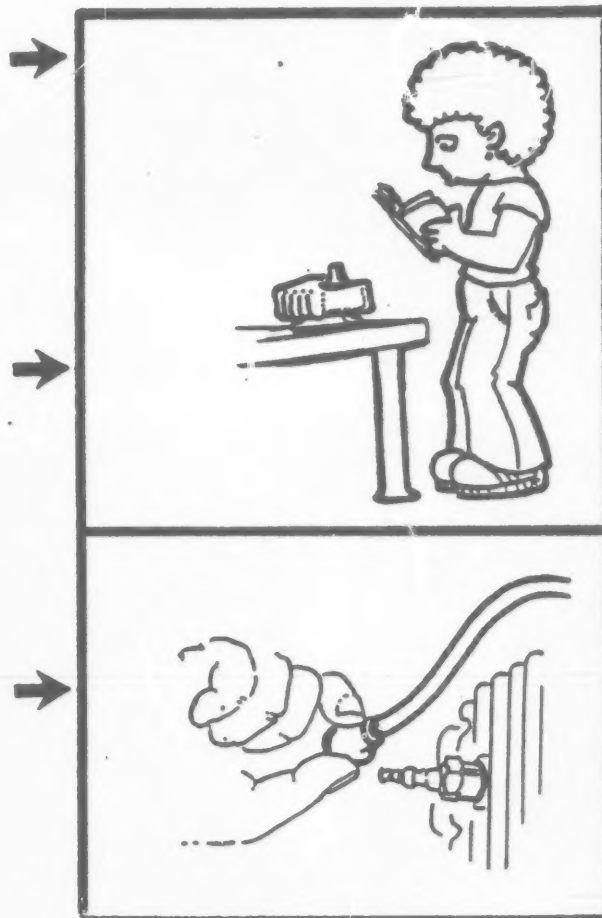
3. BEFORE STARTING WORK ON THE ENGINE, BE SURE TO REMOVE THE SPARK PLUG WIRE. WEAR YOUR SAFETY GLASSES.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL YOUR EQUIPMENT.
2. READ "SPARK PLUG SERVICING" IN MANUAL.
3. REMOVED SPARK PLUG WIRE.
4. PUT ON YOUR SAFETY GLASSES.

4. REMOVE ENGINE BLOWER SHROUD.

## LOOK:



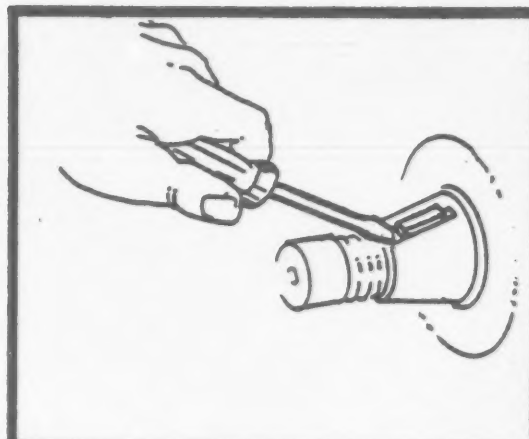


WORD GUIDEWEAR - DAMAGE, BREAKS, SCRATCHESJOB STEPSREAD:

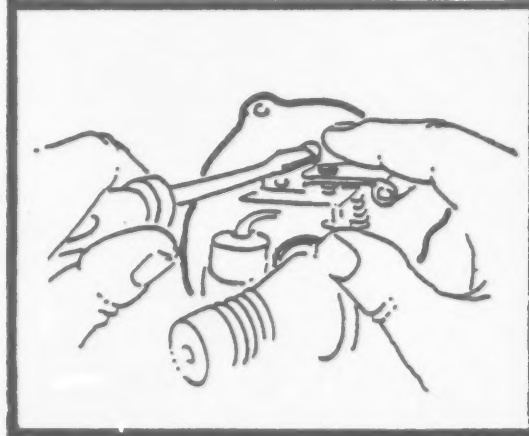
5. USING FLYWHEEL PULLER OR IMPACT NUT, REMOVE FLYWHEEL NUT AND FLYWHEEL. BE SURE YOU KNOW HOW TO USE THESE TOOLS RIGHT.

LOOK:

6. USING SCREWDRIVER, REMOVE FLYWHEEL KEY AND CHECK IT FOR WEAR. ALSO, CHECK THE FLYWHEEL KEYWAY FOR WEAR.



7. REMOVE THE ARMATURE PLATE OR STATOR ASSEMBLY AND CHECK IT FOR CRACKS OR BENDS, CHIPS AND DENTS.



"TURN THE PAGE"

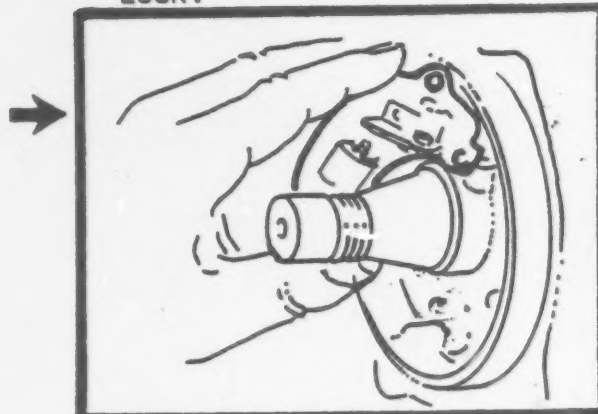
WORD GUIDEDAMAGED - WORN, BROKEN, CRACKED, ETC.

READ:

JOB STEPS

LOOK:

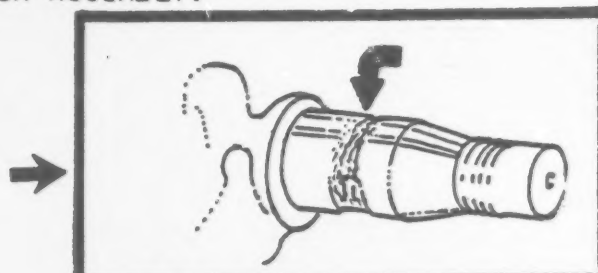
8. REPLACE STATOR ASSEMBLY ON THE ENGINE, BUT DO NOT MAKE IT TIGHT.



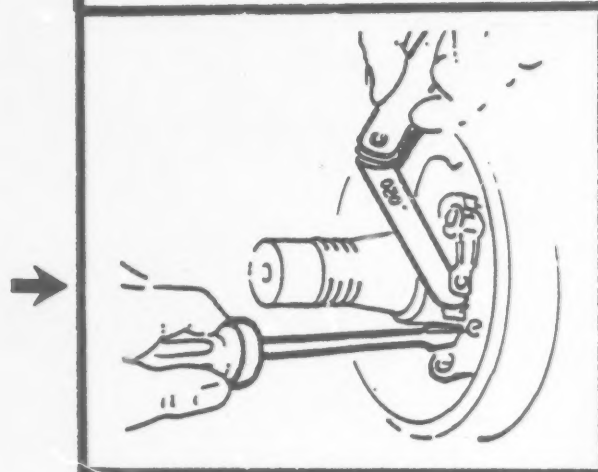
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE ENGINE BLOWER SHROUD.
2. REMOVED THE FLYWHEEL NUT AND FLYWHEEL.
3. REMOVED AND CHECKED FOR WEAR: THE FLYWHEEL KEY AND KEYWAY.
4. REMOVED THE ARMATURE PLATE ASSEMBLY AND CHECKED FOR CRACKS, DENTS, ETC.
5. REPLACED THE STATOR ASSEMBLY.

9. CHECK THE BREAKER CAM FOR WEAR OR CRACKS. IF IT IS DAMAGED, GET A NEW ONE.



10. SET BREAKER POINTS TO RIGHT OPENING (CHECK MANUAL; SET ALL POINTS AT .020 UNLESS OTHERWISE STATED ON THE STATOR PLATE OR COVER).



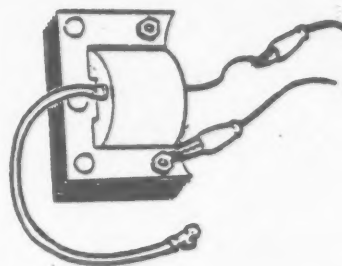
"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

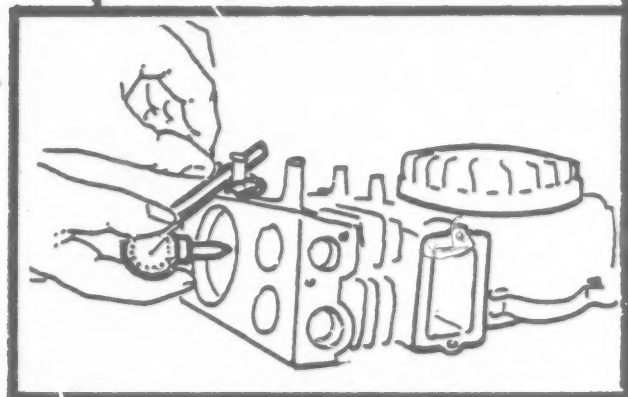
11. CHECK MAGNETO COIL FOR  
CRACKS, AND THEN CHECK IT  
WITH THE MERCOTRONIC TESTER.



12. REMOVE THE HEAD.



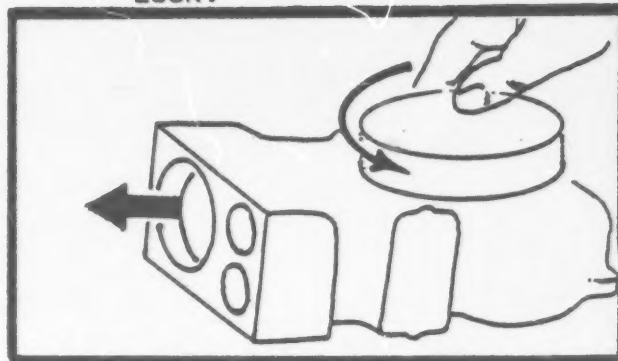
13. WITH CARE, PUT IN DIAL  
INDICATOR.



"TURN THE PAGE"

WORD GUIDETERMINAL - END PARTJOB STEPSREAD:

14. TURN AROUND THE CRANKSHAFT TO WHERE YOU CAN GET THE HIGHEST READING. THIS IS "TOP DEAD CENTER" OF THE PISTON IN THE CYLINDER ("0" DEGREES).

LOOK:

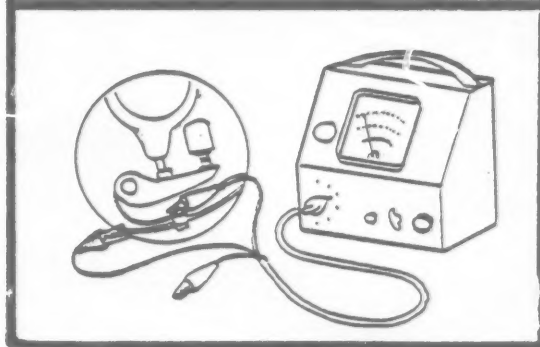
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED BREAKER CAM FOR WEAR OR CRACKS AND REPLACED IT, IF NEEDED.
2. SET BREAKER POINTS TO .020.
3. CHECKED MAGNETO COIL FOR CRACKS AND THEN CHECKED ON MERCOTRONIC TESTER.
4. REMOVED HEAD AND TURNED AROUND CRANKSHAFT TO "0" DEGREES -- "TOP DEAD CENTER".

15. TAKE OFF COIL AND CONDENSOR WIRES FROM POINTS.



16. HOOK UP MERCOTRONIC SMALL, RED LEAD WIRE TO POINT TERMINAL AND HOOK SMALL BLACK WIRE TO GROUND.

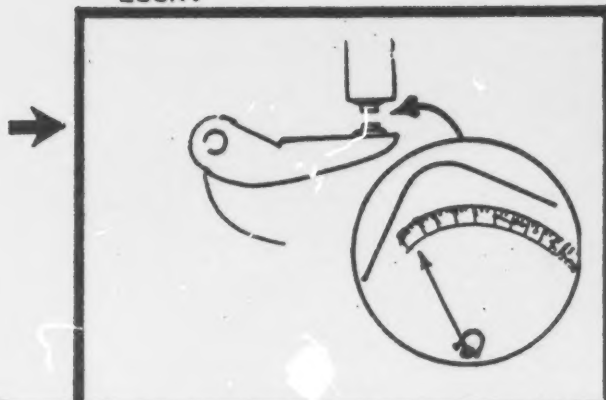


JOB STEPS

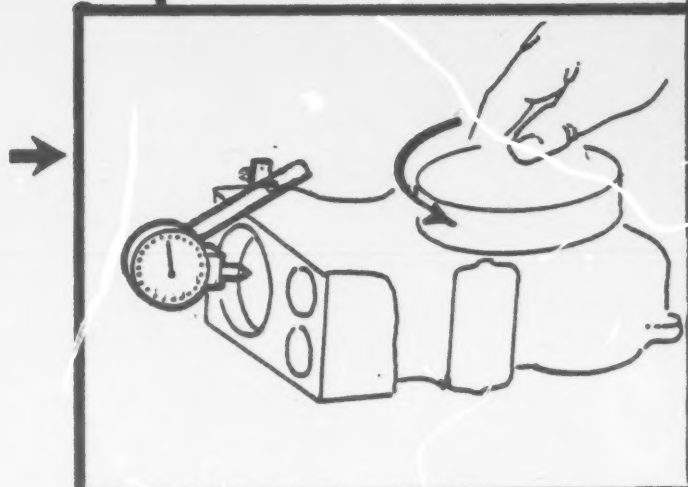
READ:

17. TURN DIAL TO #3 SPOT.  
CHECK TO SEE IF POINTS ARE  
OPEN OR CLOSED.

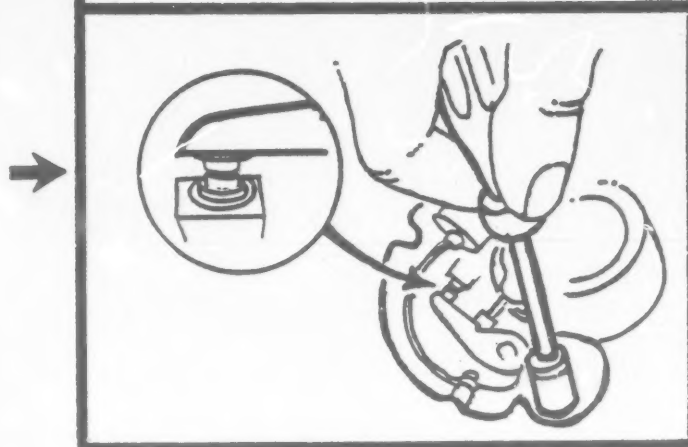
LOOK:



18. WATCH THE DIAL TURN  
AROUND CRANKSHAFT TO THE LEFT  
UNTIL DIAL READS THE  
RIGHT TIMING NUMBER FOR YOUR  
ENGINE (CHECK SERVICE MANUAL  
FOR RIGHT SETTING).



19. TURN AROUND ARMATURE PLATE  
UNTIL POINTS JUST OPEN  
(NEEDLE WILL MOVE TO LEFT OF  
DIAL) AND MAKE THE PLATE TIGHT.



"TURN THE PAGE"

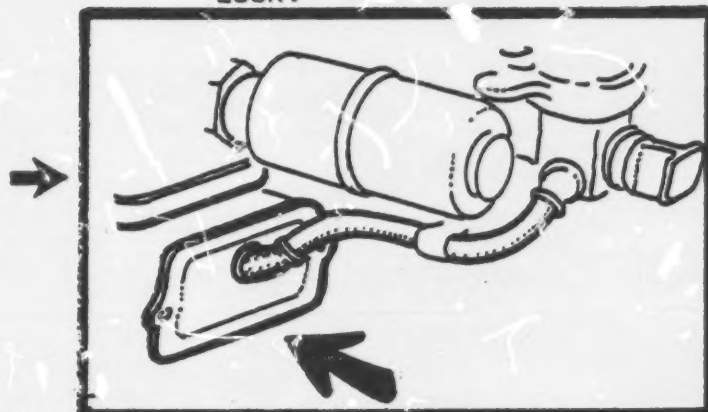


JOB STEPS

## READ:

20. TURN AROUND CRANKCASE MORE TO THE LEFT, THEN TO THE RIGHT. THE METER WILL SHOW IF THE POINTS OPEN AT THE RIGHT SETTING. IF NOT, GO BACK TO JOB STEP 18.

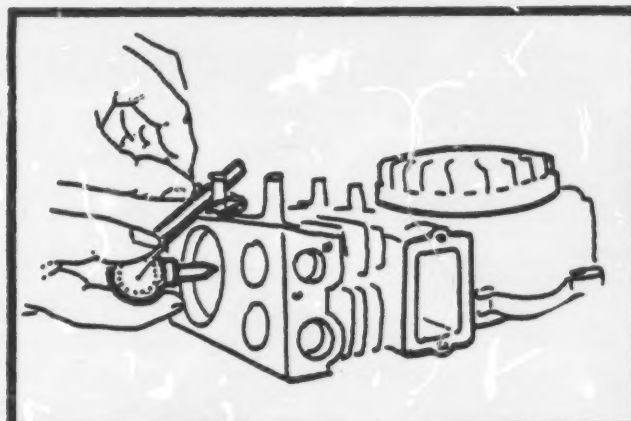
## LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. TAKEN OFF THE COIL AND CONDENSER WIRES.
2. HOOKED UP THE MERCOTRONIC WIRES RIGHT.
3. OPENED THE POINTS TO THE RIGHT SETTING.

21. REMOVE THE DIAL INDICATOR AND THE MERCOTRONIC TESTER.



22. PUT THE COIL AND CONDENSOR WIRES BACK IN.



"TURN THE PAGE"

WORD GUIDE

TORQUE - FORCE WHICH CAUSES  
TURNING AROUND MOVEMENTS

JOB STEPS

READ:

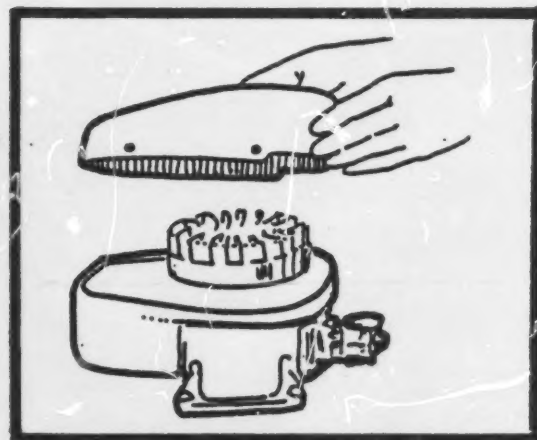
23. PUT IN THE FLYWHEEL NUT  
AND TORQUE TO MANUAL  
GUIDELINES.

LOOK:

24. PUT IN A NEW GASKET AND  
HEAD, AND TORQUE TO MANUAL  
GUIDELINES.



25. REPLACE THE ENGINE BLOWER  
SHROUD.



"TURN THE PAGE"

JOB STEPS

READ:

26. CHECK THE ENGINE OIL LEVEL  
AND THE FUEL.



LOOK:



27. REPLACE SPARK PLUG WIRE.



28. START THE ENGINE, SET  
THE IDLE, CHECK THAT THE ENGINE  
RUNS SMOOTHLY.



29. LET THE ENGINE RUN FOR  
FIVE MINUTES AND RE-TORQUE THE  
HEAD.



"TURN THE PAGE"

JOB STEPS

READ:

30. CLEAN UP YOUR WORK AREA  
AND TOOLS.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE DIAL INDICATOR AND MERCOTRONIC TESTER.
2. PUT THE COIL AND CONDENSOR WIRES BACK IN.
3. PUT IN AND TORQUED THE FLYWHEEL NUT.
4. PUT IN AND TORQUED A NEW GASKET AND HEAD.
5. REPLACED THE ENGINE BLOWER SHROUD.
6. CHECKED THE ENGINE OIL LEVEL AND FUEL.
7. REPLACED THE SPARK PLUG WIRE.
8. STARTED THE ENGINE UNTIL IT RUNS SMOOTHLY.
9. CLEANED UP YOUR WORK AREA AND TOOLS.





## small engine repair

unit: LUBRICATION

capital area career center

module: 7501 09 001 1 7501 09 001 3 date: 10/77 level: III

skill title: LUBRICATION - CHECK MANUAL & SERVICE

developed & written by: JIM PITTS AND DWIGHT SMITH

visuals by: DAVE WEHRWEIN



WORD GUIDE

LUBRICATE - TO OIL, GREASE OR WAX  
PARTS TO STOP WEAR

LUBRICANT - OIL, GREASE OR WAX

A.P.I. - AMERICAN PETROLEUM INSTITUTE

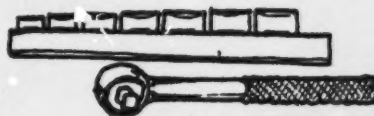
SPECIFICATIONS - GUIDELINES; RULES

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

1. HOW TO CHECK SERVICE MANUAL LUBRICATION SPECIFICATIONS.
2. HOW TO LUBRICATE MACHINE, CHANGE OIL, AND SERVICE WITH PROPER A.P.I.
3. HOW TO CHANGE ENGINE OIL AND TRANSMISSION FILTERS.

AND IN ORDER TO DO THIS YOU WILL NEED:

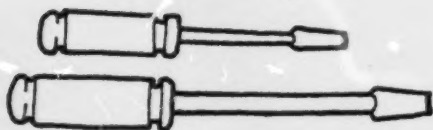
A MACHINE WITH A 2- OR  
4-CYCLE ENGINE



SOCKET SET



OPEN END WRENCHES



SCREWDRIVER SET



SAFETY GLASSES

SERVICE MANUAL



LUBRICANTS



FILTERS

"TURN THE PAGE"

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED THE EQUIPMENT AND SUPPLIES FOR THIS MOD.
2. YOU HAVE CHANGED THE TRANSMISSION AND ENGINE OIL.
3. YOU HAVE CHANGED THE TRANSMISSION AND ENGINE FILTERS.
4. YOU HAVE LUBRICATED THE TRANSMISSION AND ENGINE ACCORDING TO THE SERVICE MANUAL SPECIFICATIONS.
5. YOU HAVE PUT AWAY THE EQUIPMENT AND CLEANED UP THE WORK AREA.

"TURN THE PAGE"

WORD GUIDE

VERTICAL - UP AND DOWN, TOP TO  
BOTTOM

HORIZONTAL - SIDWAYS, ACROSS  
FROM SIDE TO SIDE

JOB STEPSREAD:

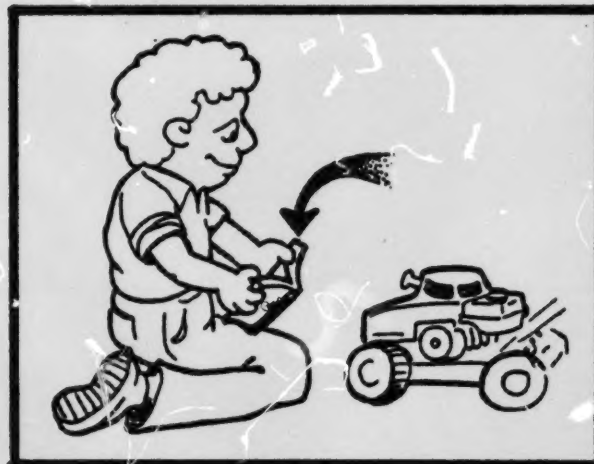
1. GET ALL THE EQUIPMENT AND  
SUPPLIES AND GO TO THE WORK  
AREA.

LOOK:

2. FIND THE FOLLOWING INFORMATION  
ABOUT THE MACHINE ON WHICH YOU  
ARE WORKING: WRITE ON A SCRAP  
PIECE OF PAPER. MOST OF THE  
INFORMATION IS IN THE OWNER'S  
MANUAL OR THE SERVICE MANUAL  
FOR THE ENGINE OR MACHINE.

MAKE OF ENGINE \_\_\_\_\_  
MODEL OF ENGINE \_\_\_\_\_ TYPE \_\_\_\_\_  
SERIAL NUMBER \_\_\_\_\_  
FLOAT, DIAPHRAGM, SUCTION, AUTO.  
CHOKE CARBURETOR? \_\_\_\_\_  
VERTICAL OR HORIZONTAL ENGINE? \_\_\_\_\_  
2- OR 4-CYCLE? \_\_\_\_\_  
WHAT KIND OF STARTER? REWIND TOP  
MOUNT, ELECTRIC START, REWIND  
SIDE MOUNT, 12-VOLT, 6-VOLT,  
110 VOLT, ROPE AND PULLEY \_\_\_\_\_

WHAT KIND OF AIR CLEANER; \_\_\_\_\_  
KIND OF TRANSMISSION \_\_\_\_\_  
TYPE OF TRANSMISSION OIL \_\_\_\_\_  
TYPE OF ENGINE OIL \_\_\_\_\_



"TURN THE PAGE"

WORD GUIDEGREASE ZERKS - SAME AS GREASE FITTINGJOB STEPSREAD:

3. LOOK IN THE OWNER'S MANUAL FOR THE LOCATION OF ANY GREASE ZERKS. IF THERE IS NO MANUAL, CHECK THE ENGINE CAREFULLY FOR ZERKS WHEREVER PARTS MOVE.

LOOK:

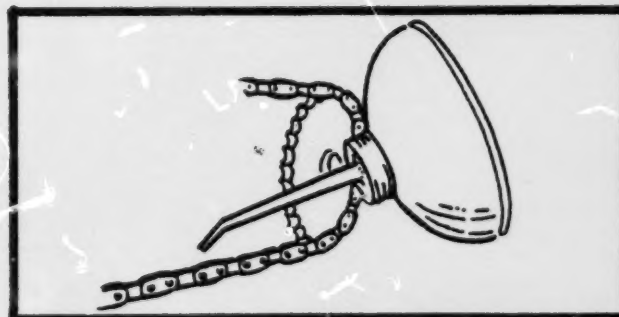
4. IF THERE IS NO ZERK WHERE PARTS MOVE, CAREFULLY OIL THE MOVING PARTS. GREASE EVERY ZERK ON THE MACHINE. WEAR YOUR SAFETY GLASSES.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL THE EQUIPMENT AND SUPPLIES.
2. FOUND THE INFORMATION LISTED IN JOB STEP 2.
3. FOUND AND GREASED ALL THE GREASE ZERKS.
4. OILED ALL MOVING PARTS THAT HAVE NO ZERKS.
5. YOUR SAFETY GLASSES ON.

5. IF THE MACHINE HAS A CHAIN (OR CHAINS), OIL WITH A GOOD CHAIN LUBRICANT.



"TURN THE PAGE"



WORD GUIDE

HYDRAULIC - OPERATED OR MOVED BY  
WATER OR OIL)

MANUAL - OPERATED BY HAND

SEALED - CLOSED

JOB STEPSREAD:

6. IF THE TRANSMISSION IS  
AUTOMATIC OR HYDRAULIC DRIVE,  
FIND THE OIL FILLER

7. FOLLOW THE STEPS IN THE  
OWNER'S MANUAL (BOOK) TO CHANGE  
THE OIL AND FILTER IN THE  
TRANSMISSION.

8. IF THE TRANSMISSION IS  
MANUAL (OR STANDARD SHIFT),  
READ THE OWNER'S MANUAL (BOOK)  
TO FIND OUT WHAT KIND OF GEAR  
LUBRICANT IT NEEDS.

NOTE: SOME MANUAL AND STICK-  
SHIFT TRANSMISSIONS ARE SEALED,  
SO YOU WILL NOT BE ABLE TO  
CHANGE OR ADD OIL TO THESE.

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. OILED THE CHAINS ON THE MACHINE.
2. CHANGED THE TRANSMISSION OIL AND FILTER.
3. FOUND OUT IF THE TRANSMISSION IS SEALED OR NOT, AND FOUND WHAT KIND OF GEAR LUBRICANT IT NEEDS.

"TURN THE PAGE"



WORD GUIDE

DIPSTICK - LONG, THIN METAL ROD  
FOR MEASURING OIL LEVELS

JOB STEPS

READ:

9. USE THE ENGINE DIPSTICK AND  
CHECK THE OIL LEVEL IN THE  
ENGINE.

SAFETY NOTE: BEFORE STARTING  
THE ENGINE, CHECK THE SERVICE  
MANUAL AND FOLLOW ALL SAFETY  
RULES LIKE KEEPING TRANSMISSION  
IN NEUTRAL GEAR, ETC.

LOOK:



10. IF THE OIL IS AT A SAFE  
LEVEL, START THE ENGINE.

IF THE OIL IS NOT AT A SAFE  
LEVEL, TELL YOUR INSTRUCTOR.



11. WARM UP THE ENGINE FOR  
2 TO 5 MINUTES.



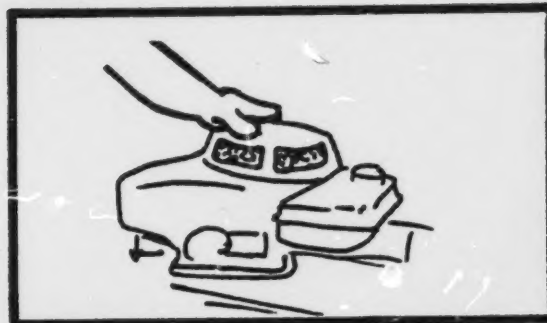
"TURN THE PAGE"

JOB STEPS

READ:

12. SHUT OFF THE ENGINE.

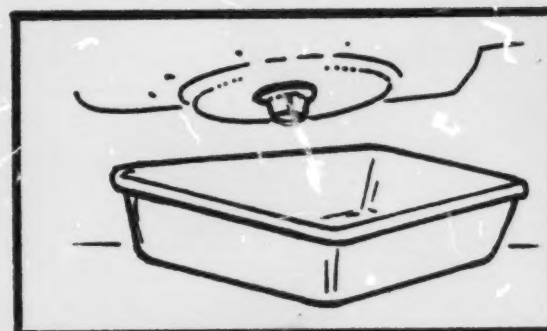
LOOK:



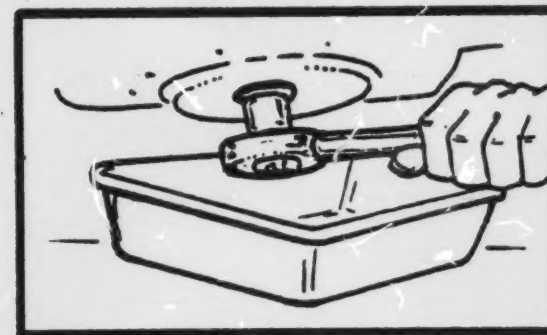
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CHECKED THE ENGINE OIL.
2. FOLLOWED ALL SAFETY RULES.
3. WARMED UP THE ENGINE FOR 2 TO 5 MINUTES AND THEN SHUT IT OFF.

13. PUT A DRAIN PAN UNDER THE DRAIN PLUG TO CATCH THE OIL.



14. USE A WRENCH OR SOCKET TO TAKE OUT THE OIL DRAIN PLUG.



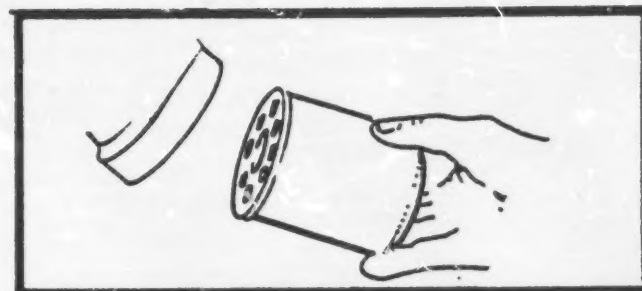
15. WHEN THE OIL HAS ALL DRAINED OUT, PUT THE DRAIN PLUG BACK IN. BE CAREFUL NOT TO LEAVE IT TOO LOOSE OR TOO TIGHT.

"TURN THE PAGE"

JOB STEPS

READ:

16. CHANGE THE OIL FILTER.  
FOLLOW THE INSTRUCTIONS IN THE  
OWNER'S MANUAL OR THE SERVICE  
MANUAL.



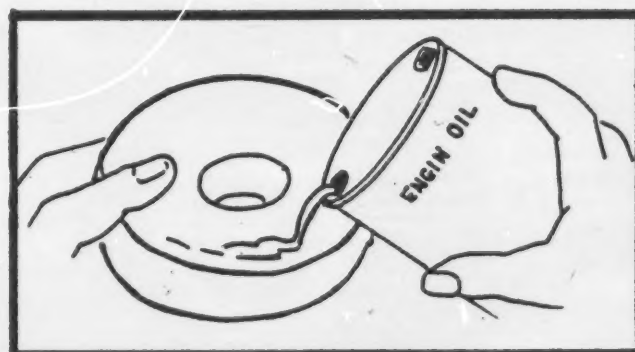
17. PUT THE RIGHT AMOUNT OF THE  
RIGHT OIL IN THE CRANKCASE OF  
THE ENGINE. DOUBLE-CHECK THE  
OIL DRAIN PLUG TO BE SURE IT  
DOES NOT LEAK OR WORK LOOSE.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. USED A DRAIN PAN TO CATCH THE OIL.
2. DRAINED THE OIL.
3. CHANGED THE OIL FILTER.
4. PUT THE CORRECT AMOUNT OF THE PROPER OIL  
INTO THE ENGINE CRANKCASE.

18. CLEAN THE AIR FILTER AND  
RE-OIL IT IF NEEDED. SEE  
MODULE 7501 02 001 1/  
7501 02 001 3.



"TURN THE PAGE"

JOB STEPS

READ:

LOOK:

19. CLEAN UP THE MACHINE FOR  
CUSTOMER PICK-UP.

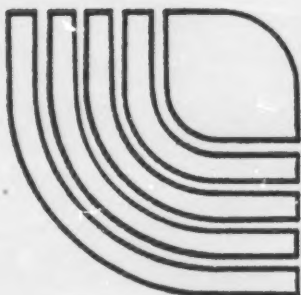
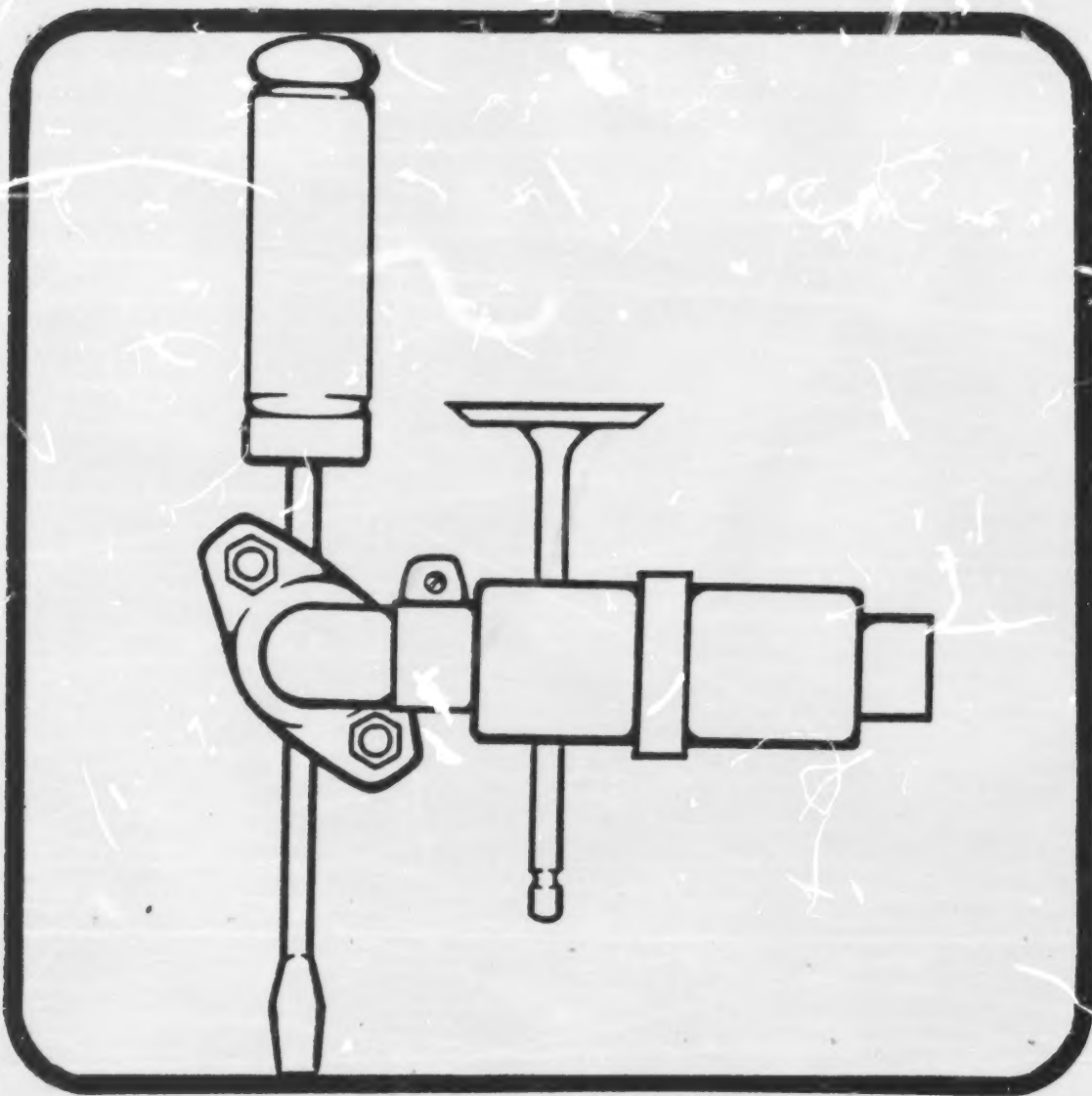


20. PUT AWAY THE EQUIPMENT AND  
SUPPLIES.

21. CLEAN UP THE WORK AREA.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CLEANED THE AIR FILTER.
2. CLEANED UP THE MACHINE FOR THE CUSTOMER.
3. PUT AWAY THE EQUIPMENT AND SUPPLIES AND  
CLEANED UP THE WORK AREA.



## small engine repair

unit: GEAR BOXES AND DRIVE TRAINS

capital area career center

module: 7501 10 001 1 7501 10 001 3 date: MARCH 1978 level: I

skill title: REMOVE AND REPLACE TRANSAXLE JOHN DEERE TRACTOR

(200 SERIES)

developed & written by: JACK HELDER

visuals by: DAVE WEHRWEIN & BRUCE BENNETT



WORD GUIDE

TRANSAXLE - A UNIT CONSISTING OF A TRANSMISSION AND A DIFFERENTIAL AXLE.

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO REMOVE AND REPLACE THE TRANSAXLE ON A JOHN DEERE 200 SERIES TRACTOR.

IN ORDER TO DO THIS YOU WILL NEED:

JOHN DEERE TRACTOR, 200 SERIES

1 SOCKET SET

1 OPEN END WRENCH SET

1 BOX END WRENCH SET

1 PLIERS

AUTOMOTIVE JACK

BLOCKS OR HOLDING FRAME

SAFETY GLASSES

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE COLLECTED ALL EQUIPMENT.
2. YOU HAVE REMOVED TRANSAXLE AND OTHER PARTS ACCORDING TO JOB STEPS.
3. YOU HAVE REPLACED TRANSAXLE AND ALL PARTS SO THAT TRACTOR RUNS AS IT SHOULD.

"TURN THE PAGE"

JOB STEPS

READ:

1. TAKE YOUR EQUIPMENT AND THE TRACTOR TO YOUR WORK AREA.

\*\*\*\*\*  
\*\* CAUTION: PUT ON YOUR \*\*  
\*\* SAFETY GLASSES. \*\*  
\*\*\*\*\*

2. TO REMOVE FENDER DECK, FOLLOW STEPS A-H BELOW.

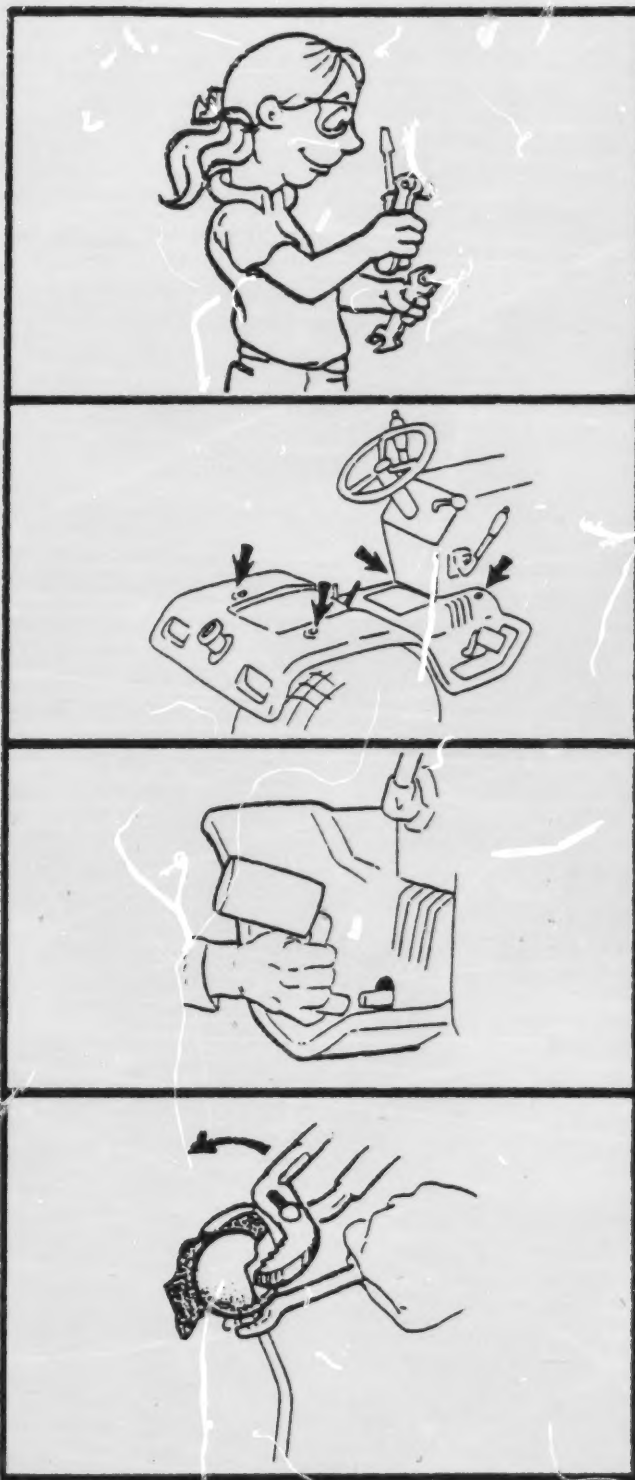
A. REMOVE 4 BOLTS - 2 IN FRONT, 2 IN BACK.

B. REMOVE 2 FOOT PEDALS.

C. UNSCREW THE HANDLE TOPS:

- 1) PROTECT KNOB WITH A RAG AND LOOSEN WITH PLIERS.
- 2) HOLD HANDLE NUT WITH A WRENCH.

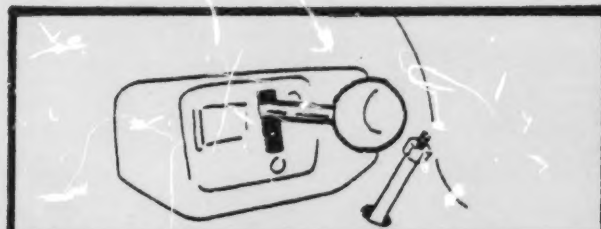
LOOK:



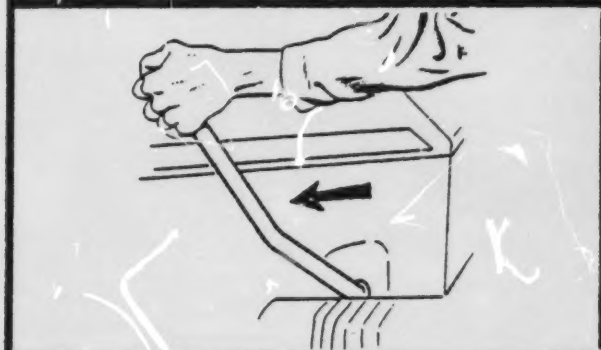
READ:

LOOK:

D. PUT GEAR SHIFT IN NEUTRAL.



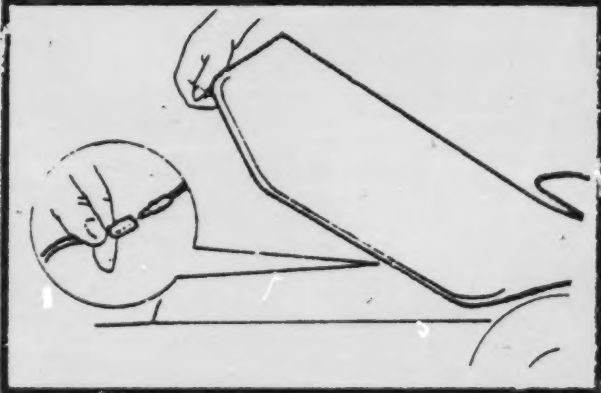
E. DROP BLADE (HANDLE ON LEFT SIDE).



F. HAVE SOMEONE HOLD UP FENDER DECK BY PULLING OUT ON PEDAL HOLDERS.



G. WHILE DECK IS HELD UP, REMOVE ELECTRIC WIRE TO SEAT SENSOR.



H. PULL THE FENDER DECK BACKWARD. DON'T LOSE THE BLACK SPACER ON THE FRONT LEFT SIDE.

CHECK: HAVE YOUR INSTRUCTOR CHECK THAT YOU HAVE:

1. REMOVED THE 4 BOLTS.
2. REMOVED FOOT PEDALS.
3. TAKEN OFF THE HANDLE TOP WITHOUT SCRATCHING KNOB.
4. REMOVED SEAT SENSOR WIRE.
5. PULLED BACK THE FENDER DECK WITHOUT LOSING THE BLACK SPACER.

JOB STEPS

READ:

LOOK:

3. NOW FOLLOW THE STEPS BELOW (A-F) TO REMOVE AND DRAIN THE GAS TANK.

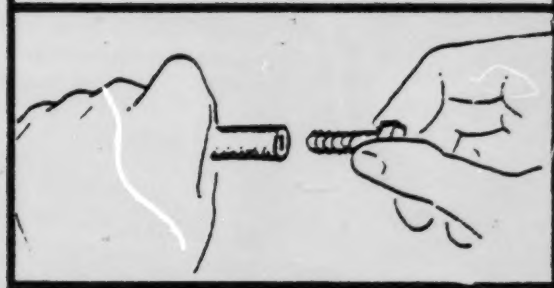
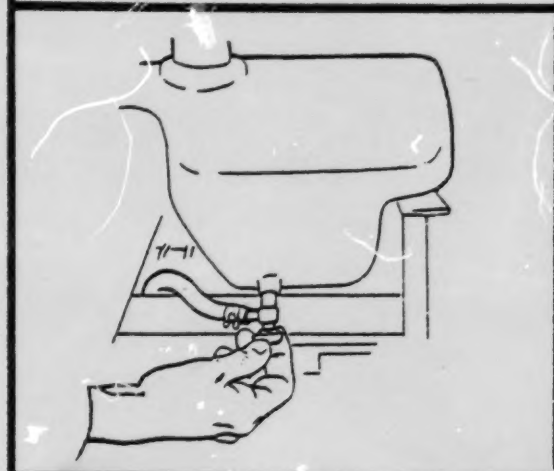
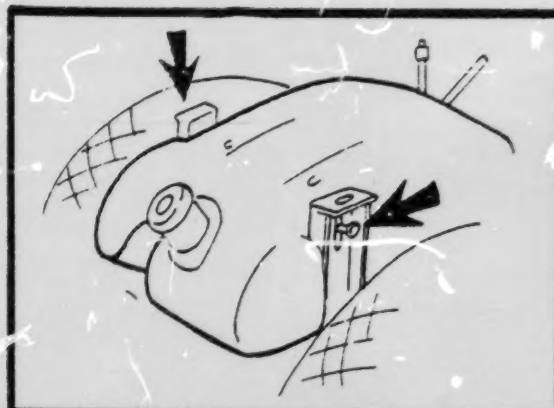
A. REMOVE 2 BOLTS ON SIDE OF TANK.

B. TWIST VALVE UNDER THE TANK TO THE LEFT. THIS SHUTS OFF GAS.

C. USE PLIERS TO REMOVE GAS LINE CLAMP.

D. PLUG THE GAS LINE WITH A BOLT.

E. NOTICE WHERE GAS LINE IS PLACED OVER THE TRANSMISSION. YOU MUST REMEMBER TO PUT IT BACK LATER.



JOB STEPS

READ:

LOOK:

F. PUT GAS FROM TANK INTO  
A SAFE CONTAINER.

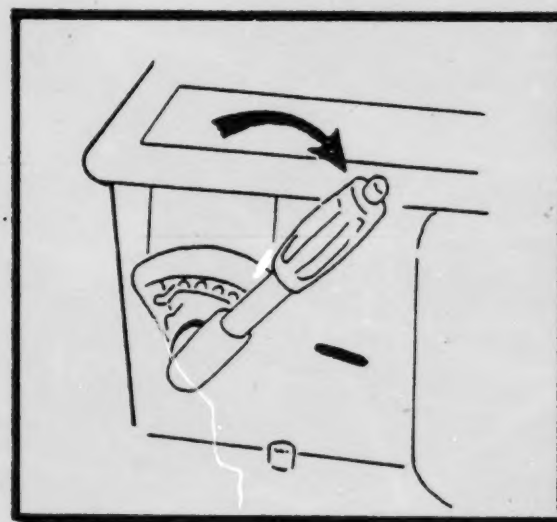


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED GAS TANK.
2. SHUT OFF GAS VALVE.
3. REMOVED GAS LINE CLAMP.
4. PLUGGED GAS LINE WITH A BOLT.
5. LEARNED WHERE GAS LINE GOES OVER THE TRANSMISSION.
6. EMPTIED GAS TANK IN A SAFE CONTAINER.

4. FOLLOW THESE STEPS (A-C)  
TO REMOVE SECONDARY BELT:

A. START THE ENGINE AND  
MOVE VARIABLE SPEED  
CONTROL TO FORWARD.



\*\*\*\*\*  
\*\* CAUTION: BE SURE GEAR \*\*  
\*\* IS IN NEUTRAL. \*\*  
\*\*\*\*\*

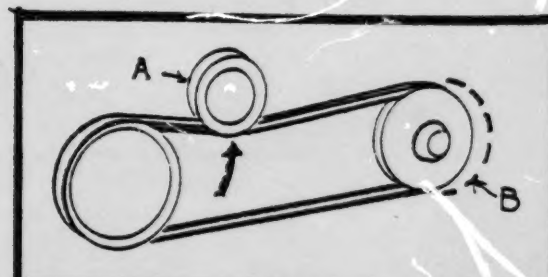


JOB STEPS

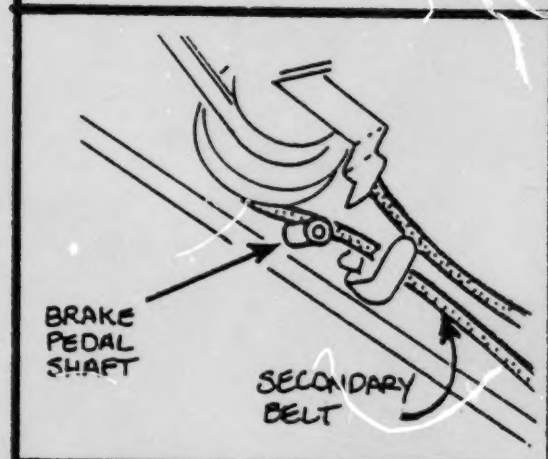
READ:

LOOK:

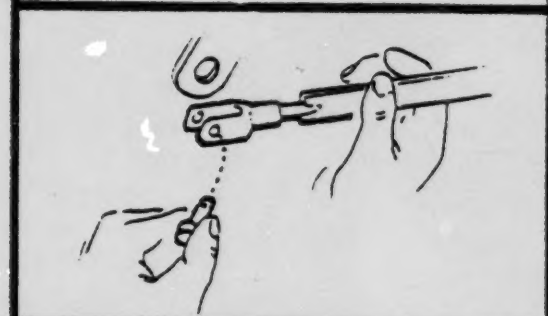
- B. RAISE THE SECONDARY BELT IDLER (A) AND SLIP SECONDARY BELT (B) OFF IDLER.



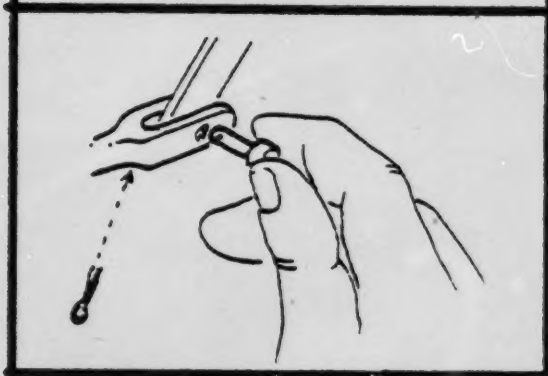
- C. PUSH IN CLUTCH SO YOU CAN PULL SECONDARY BELT PAST THE BRAKE PEDAL SHAFT. TURN OFF ENGINE.



5. REMOVE COTTER PIN AND DRILLED PIN FROM BRAKE ARM.



6. REMOVE COTTER PIN FROM BRAKE PEDAL LINKAGE TO CROSS SHAFT.



JOB STEPS

READ:

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED SECONDARY BELT.
2. SHUT OFF ENGINE.
3. REMOVED COTTER PIN AND DRILLED PIN FROM BRAKE ARM.
4. REMOVED COTTER PIN FROM BRAKE PEDAL LINKAGE TO CROSS SHAFT.

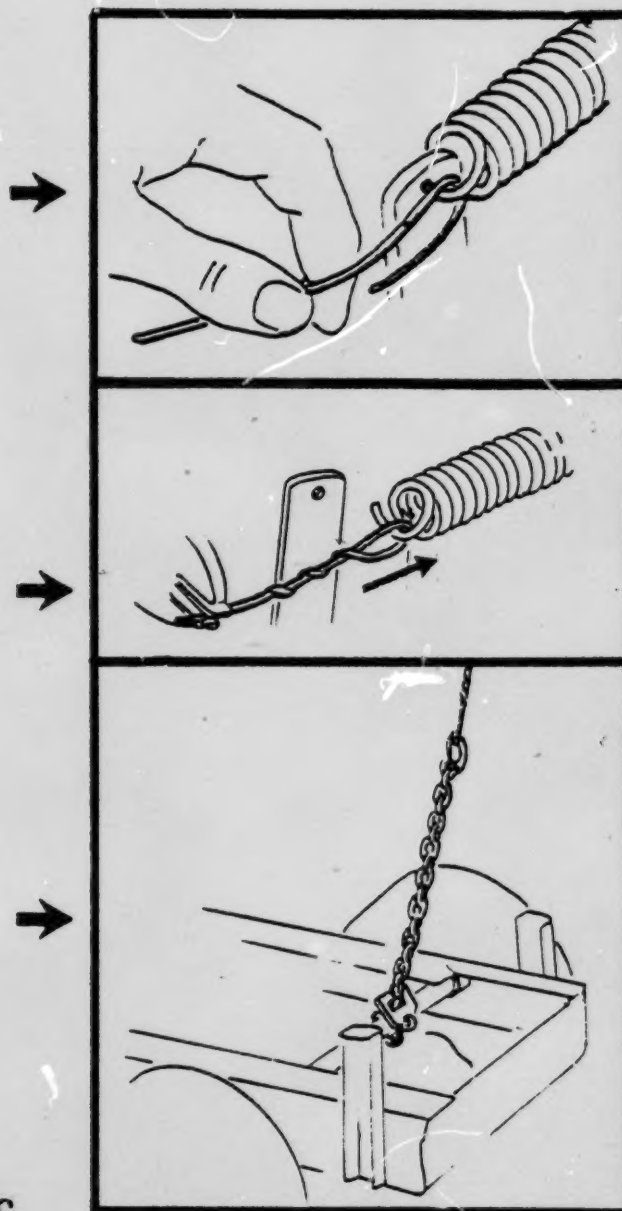
7. HAVE YOUR INSTRUCTOR HELP YOU REMOVE IDLER PULLEY TENSION SPRING BY FOLLOWING THESE STEPS (A-B):

- A. HOOK STIFF WIRE TO SPRING END SO YOU CAN LET IT BACK EASY AND KEEP HOOK ON BRACKET.

\*\*\*\*\*  
\*\* CAUTION: DON'T LET SPRING  
\*\* FLY AWAY. IT CAN HURT.  
\*\*  
\*\*\*\*\*

- B. USE VICE GRIPS TO SLOWLY LET BACK THE SPRING UNTIL TENSION IS RELEASED.

8. USE A HOIST TO SUPPORT THE BACK END. PUT CHAIN ON THE CROSS SHAFT.



JOB STEPS

READ:

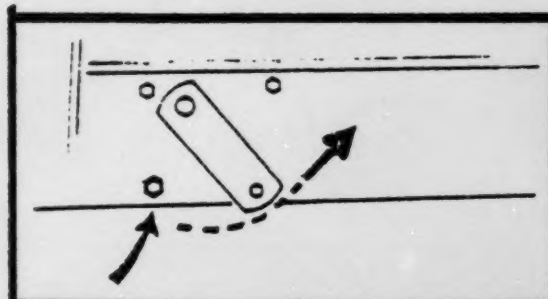
LOOK:

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

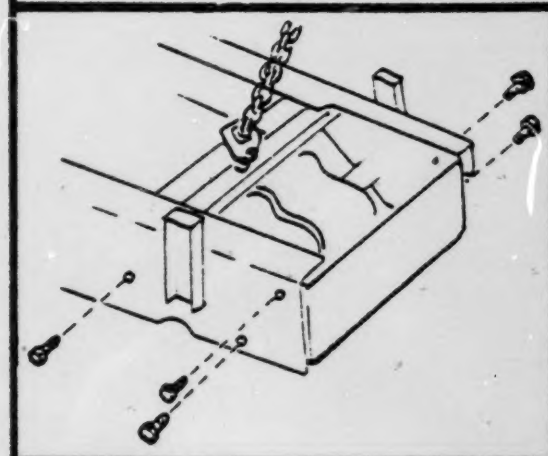
1. RELEASED SPRING TENSION.
2. PUT HOIST CHAIN ON CROSS SHAFT TO SUPPORT BACK END OF TRACTOR.

9. TO REMOVE THE 6 BOLTS FROM THE TRANSAXLE TO THE TRANSMISSION, FOLLOW STEPS A-E BELOW:

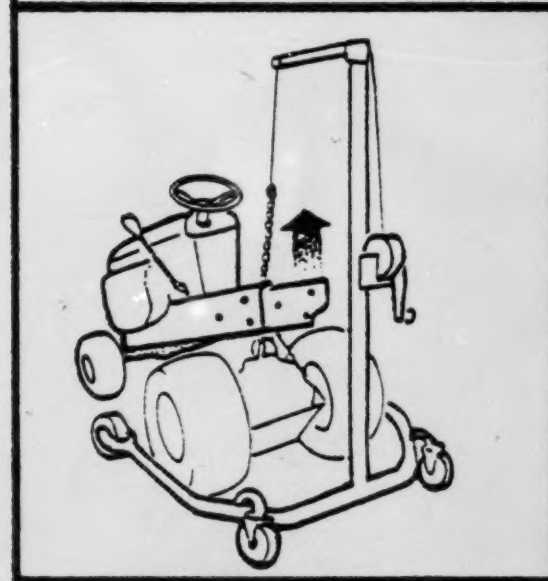
A. PUSH BRAKE ARM FORWARD TO REMOVE ONE RIGHT SIDE BOLT.



B. REMOVE OTHER BOLTS.



C. USE HOIST TO RAISE FRAME ABOVE TRANSAXLE.



D. PUT BLOCKS UNDER CUTTING UNIT, THEN UNHOOK HOIST AND PULL AWAY.

E. SHIFT INTO NEUTRAL AND WHEEL AWAY THE TRANSAXLE.

JOB STEPS

READ:

LOOK:

CHECK: ASK YOUR INSTRUCTOR TO:

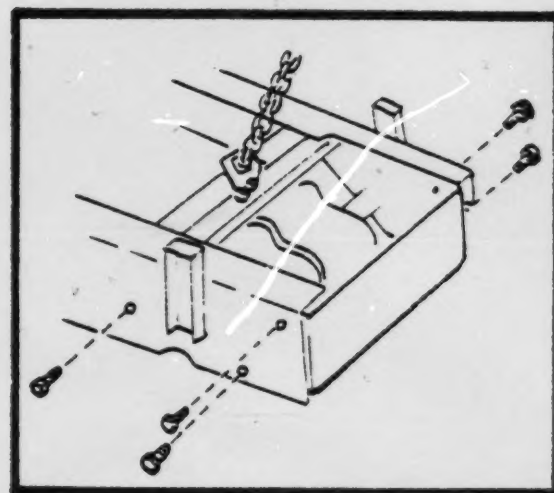
1. CHECK THAT YOU HAVE REMOVED THE TRANSAXLE SAFELY AND COMPLETELY.
2. DECIDE WHAT REPAIRS, IF ANY, MUST BE DONE BEFORE YOU REPLACE THE TRANSAXLE.

## 10. TO REPLACE THE TRANSAXLE;

- A. GET SOME HELP TO GUIDE SHIFT LEVER INTO THE SLOT.
- B. THEN PUSH THE TRANSAXLE BACK UNDER THE FRAME.



## 11. REPLACE THE 6 BOLTS.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REPLACED TRANSAXLE UNDER FRAME.
2. REPLACED THE 6 BOLTS.



## WORD GUIDE

VARIATOR - A PULLEY WITH AN ADJUSTABLE SHEAVE FOR SPEED CONTROL.

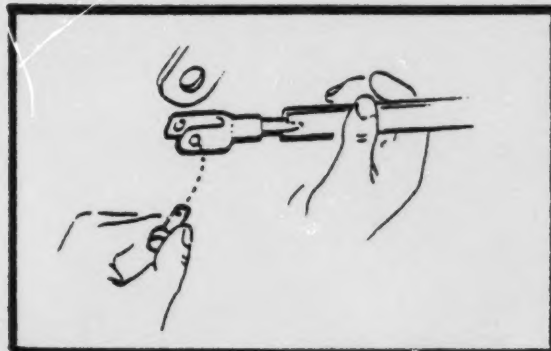
SHEAVE - GROOVED WHEEL.

JOB STEPS

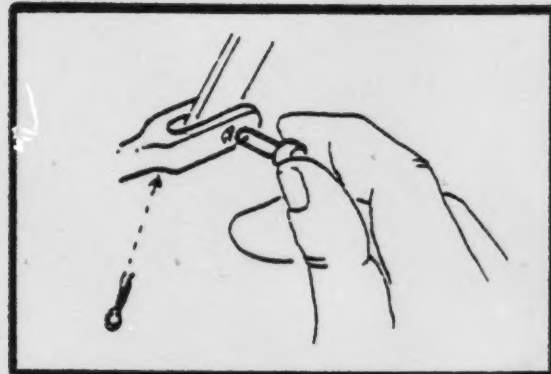
READ:

LOOK:

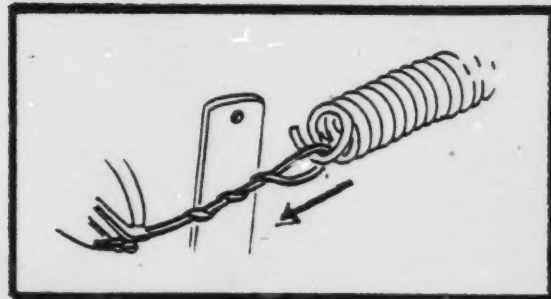
12. REPLACE PIN IN THE BRAKE ARM.



13. REPLACE THE COTTER PIN WHERE THE BRAKE PEDAL LINKAGE MEETS THE CROSS SHAFT.



14. CHECK THAT VARIATOR CONTROL IS IN "FAST" POSITION. THEN CONNECT IDLER SPRING.



NOTE: REMEMBER TO USE WIRE AND VICE GRIPS AS IN STEP 7.

"TURN THE PAGE"



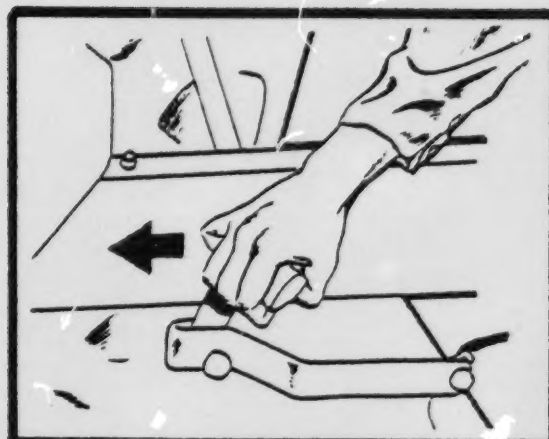
JOB STEPS

READ:

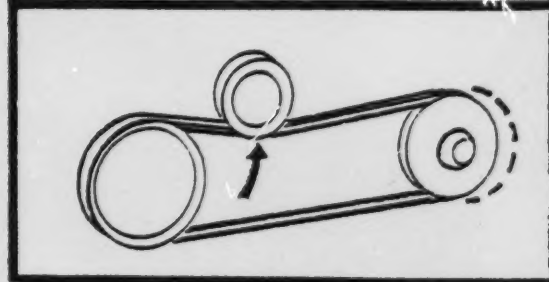
LOOK:

15. REPLACE BELT ON VARIATOR SHEAVE FOLLOWING STEPS "A" AND "B".

A. DEPRESS CLUTCH PEDAL.



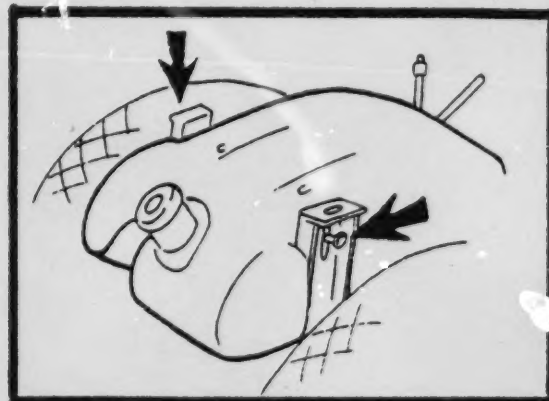
B. RAISE SECONDARY BELT IDLER AND INSTALL BELT ON TRANSMISSION-DRIVEN SHEAVE.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REPLACED PIN IN BRAKE ARM.
2. REPLACED COTTER PIN BETWEEN BRAKE PEDAL LINKAGE AND CROSS SHAFT.
3. CONNECTED IDLER SPRING.
4. REPLACED BELT ON VARIATOR SHEAVE.

16. INSTALL FUEL TANK AND PUT FUEL IN.



JOB STEPS

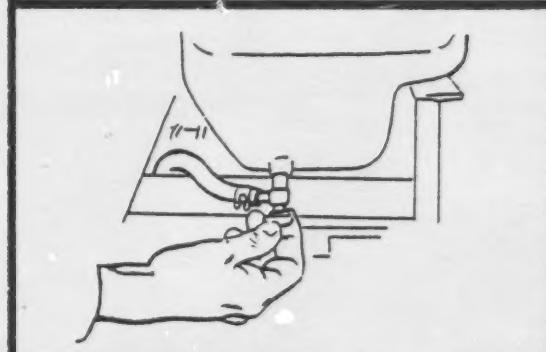
READ:

LOOK:

17. PUT GAS LINE IN ON THE  
SAME PLACE AS YOU TOOK IT OUT.



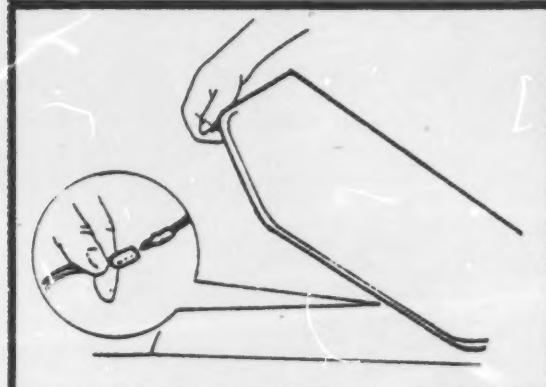
18. TURN ON FUEL VALVE.



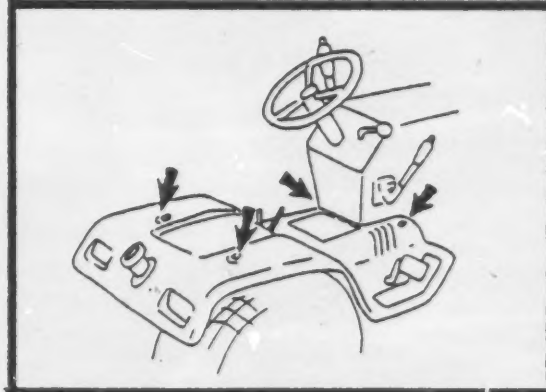
19. TO REPLACE FENDER DECK,  
FOLLOW STEPS A-E BELOW.

A. HAVE SOMEONE HELP YOU  
PUT IT ON THE SAME WAY  
YOU TOOK IT OFF.

B. BE SURE TO PLUG IN THE  
SEAT SENSOR.



C. REPLACE THE 4 BOLTS. BE  
SURE TO PUT THE BLACK  
SPACER ON THE RIGHT BOLT.

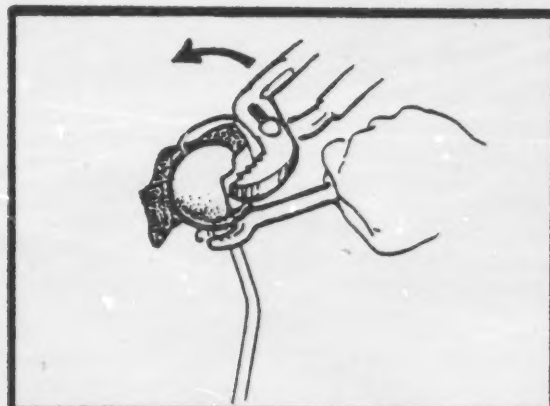


JOB STEPS

READ:

LOOK:

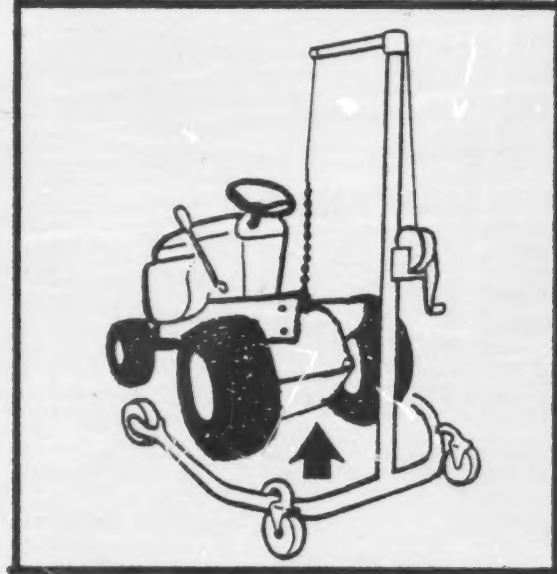
D. REPLACE THE SHIFT HANDLE.



E. REPLACE THE 2 FOOT PEDALS.



20. USE HOIST TO LIFT REAR WHEELS SLIGHTLY OFF THE FLOOR.



JOB STEPS

READ:

LOOK:

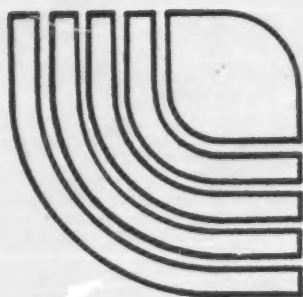
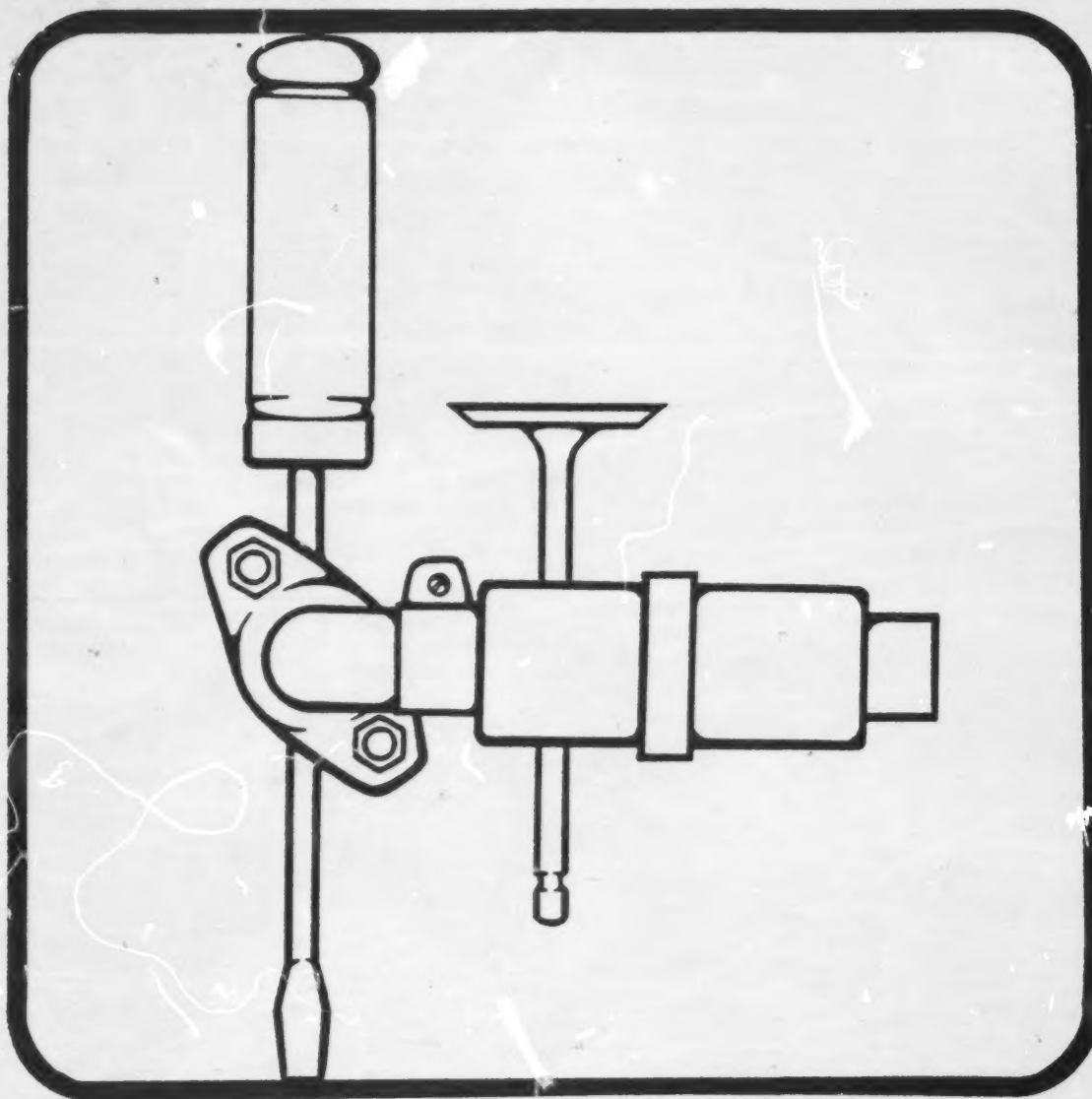
21. START THE TRACTOR AND  
SHIFT IT INTO GEAR.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. INSTALLED GAS TANK AND PUT GAS IN.
2. PUT GAS LINE AND SEAT SENSOR WIRE IN RIGHT PLACE.
3. TURNED ON FUEL VALVE.
4. REPLACED FENDER DECK, SHIFT HANDLE AND FOOT PEDALS.
5. LIFTED REAR WITH HOIST AND TESTED THAT ENGINE GOES INTO GEAR.

22. PUT AWAY ALL TOOLS AND  
CLEAN UP YOUR WORK AREA.



## small engine repair

unit: GEAR BOXES AND DRIVE TRAINS

capital area career center

module: 7501 10 002 1 7501 10 002 3 date: OCTOBER 1977 level: I

skill title: REMOVE AND REPLACE DRIVE BELT ON SIMPLICITY

MODEL 4108 8-HP TRACTOR (AND MODEL 4008)

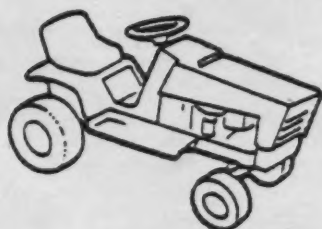
developed & written by: A. STEINBERG

visuals by: DAVE WEHRWEIN

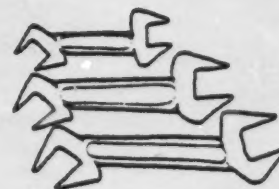


WORD GUIDEREMOVE - TAKE OUTREPLACE - PUT BACKPERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

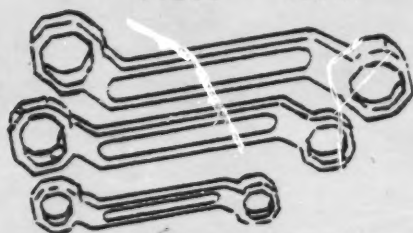
HOW TO REMOVE AND REPLACE THE DRIVE BELT ON A SIMPLICITY TRACTOR (MODELS 4108 AND 4008).

AND IN ORDER TO DO THIS YOU WILL NEED:SIMPLICITY TRACTOR(S)  
(4108 - 4008)

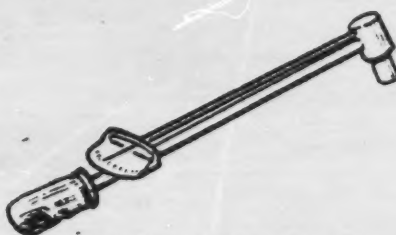
SOCKET SET



OPEN-END WRENCH SET



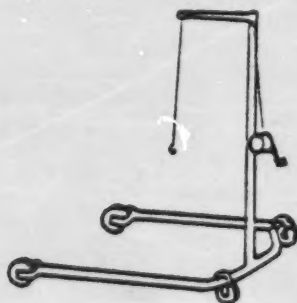
BOX-END WRENCH SET



TORQUE WRENCH



DRIVE BELT



HOIST



SAFETY JACKSTAND



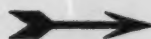
SAFETY GLASSES

"TURN THE PAGE"

WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE GATHERED ALL YOUR EQUIPMENT.
2. YOU REPLACE THE DRIVE BELT SO IT DOES NOT SLIDE OR JERK AND IT TRANSFERS SO THAT THE TRACTOR MOVES SMOOTHLY.

"TURN THE PAGE"

WORD GUIDEINSPECT - LOOK OVER CAREFULLYPRECAUTIONS - THINGS YOU DO TO  
PREVENT ACCIDENTSJOB STEPS

READ:

1. GET ALL THE EQUIPMENT AND  
TAKE IT TO YOUR WORK AREA.



LOOK:

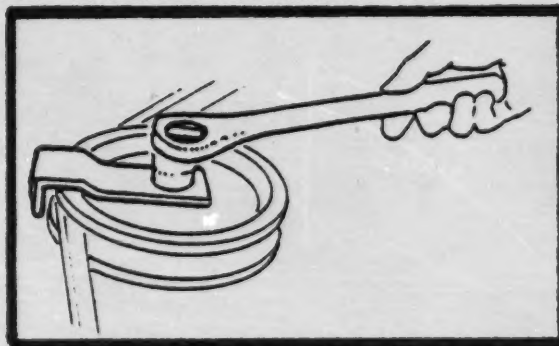


2. RAISE THE TRACTOR AND PLACE  
SAFETY JACKSTANDS UNDER THE  
REAR AND FRONT AXLES. ASK YOUR  
INSTRUCTOR TO HELP YOU.



\*\*\*\*\*  
CAUTION: DO NOT BEGIN WORK ON THE TRACTOR  
UNTIL YOUR INSTRUCTOR HAS  
INSPECTED YOUR SAFETY  
PRECAUTIONS.  
\*\*\*\*\*

3. USING THE SOCKET WRENCH,  
LOOSEN THE BELT STOP FROM THE  
CLUTCH IDLER PULLEY. WEAR YOUR  
SAFETY GLASSES.



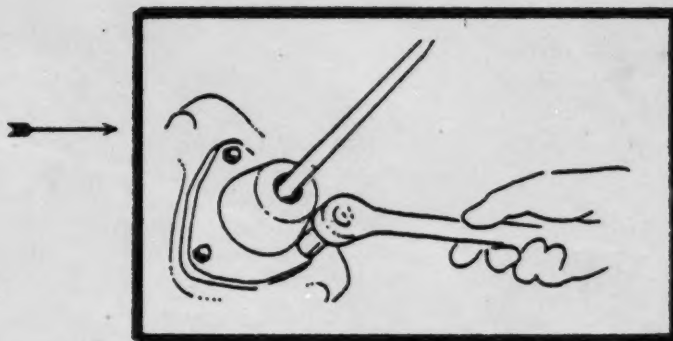
"TURN THE PAGE"

WORD GUIDEDISCONNECT - TAKE APART, SEPARATEJOB STEPS

READ:

4. REMOVE THE THREE (3) CAP SCREWS TO DISCONNECT THE GEAR-SHIFT LEVER AT THE TRANSAXLE. BE CAREFUL THAT NO DIRT ENTERS THE TRANSAXLE. USE A CLEAN CLOTH TO PLUG THE HOLE, IF NEEDED.

LOOK:

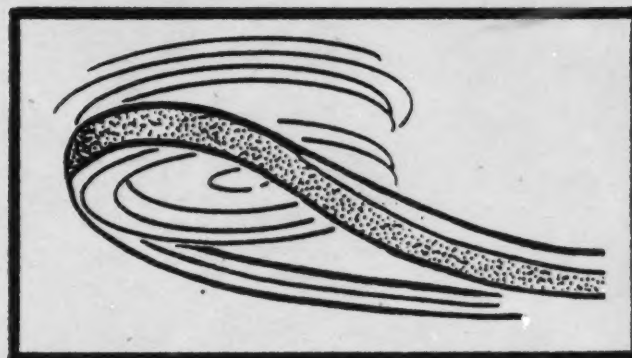


CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. RAISED THE TRACTOR AND SET UP THE SAFETY JACKSTANDS.
3. LOOSENED THE BELT STOP FROM THE CLUTCH IDLER PULLEY.
4. DISCONNECTED THE GEARSHIFT LEVER AT THE TRANSAXLE.

5. PRESS DOWN THE CLUTCH PEDAL TO REMOVE TENSION FROM THE DRIVE BELT.

6. REMOVE THE BELT FROM THE ENGINE DRIVE PULLEY AND CLUTCH IDLER PULLEY.



"TURN THE PAGE"



JOB STEPS

READ:

7. TURN THE BELT SIDWAYS TO SLIP IT OFF THE TRANSAXLE PULLEY AND REMOVE THE BELT FROM THE TRACTOR.

NOTE: IN ORDER TO REMOVE THE BELT, YOU MAY HAVE TO LOOSEN THE TRANSAXLE PULLEY AND PRESS IT FURTHER ONTO THE SHAFT TO GAIN ENOUGH ROOM BETWEEN FRAME AND PULLEY.

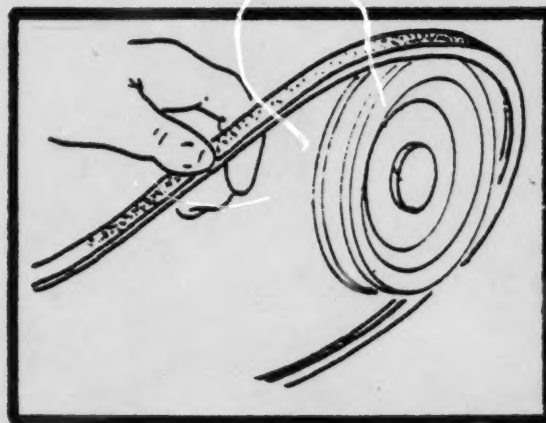
8. PLACE A NEW BELT ON THE TRANSAXLE PULLEY. IF YOU NEEDED TO LOOSEN THE PULLEY TO REMOVE THE OLD BELT, PLACE A NEW BELT ON THE PULLEY. RETURN THE PULLEY TO ITS FIRST PLACE AND RE-TIGHTEN.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. PRESSED DOWN THE CLUTCH PEDAL TO REMOVE THE DRIVE BELT TENSION.
2. REMOVED THE BELT FROM THE ENGINE DRIVE PULLEY AND CLUTCH IDLER PULLEY.
3. TURNED THE BELT SIDWAYS TO SLIP IT OFF THE TRANSAXLE PULLEY AND REMOVED THE BELT FROM THE TRACTOR.
4. PLACED A NEW BELT ON THE TRANSAXLE PULLEY.

9. PRESS DOWN ON CLUTCH PEDAL AND REPLACE THE BELT ON THE ENGINE DRIVE PULLEY AND CLUTCH IDLER PULLEY.

LOOK:



"TURN THE PAGE"

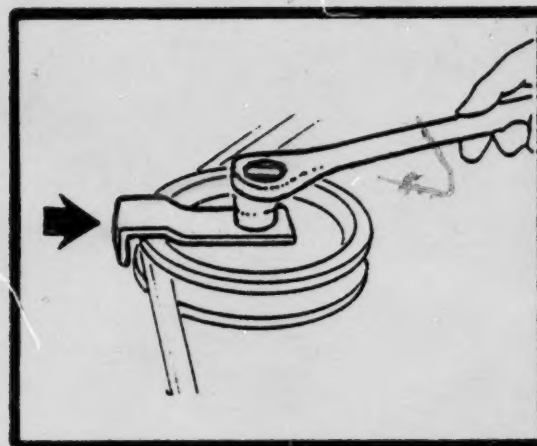


JOB STEPS

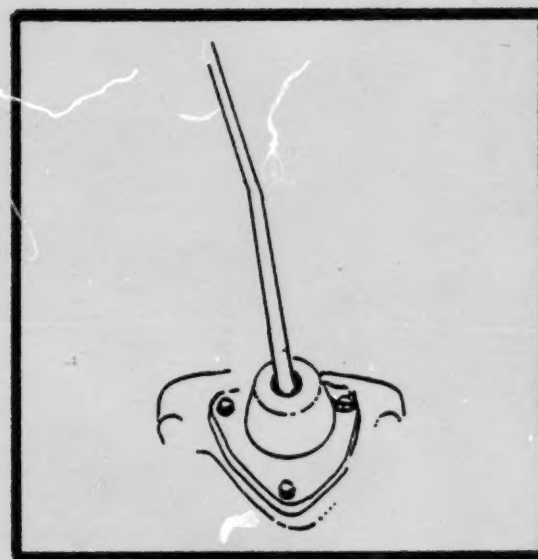
READ:

LOOK:

10. PUT THE IDLER PULLEY BELT STOP BACK IN. THE IDLER PULLEY BELT STOP SHOULD BE PLACED SO IT FACES SIDE-TO-SIDE ON THE PULLEY. TIGHTEN THE CAP SCREW WITH 18 - 11 FT. LBS. OF TORQUE.



11. PUT THE SHIFT LEVER BACK IN. THE SHIFT LEVER MUST BE PLACED WITH THE GROOVED SIDE OF THE SHIFT LEVER HUB TO THE RIGHT (BRAKE SIDE).

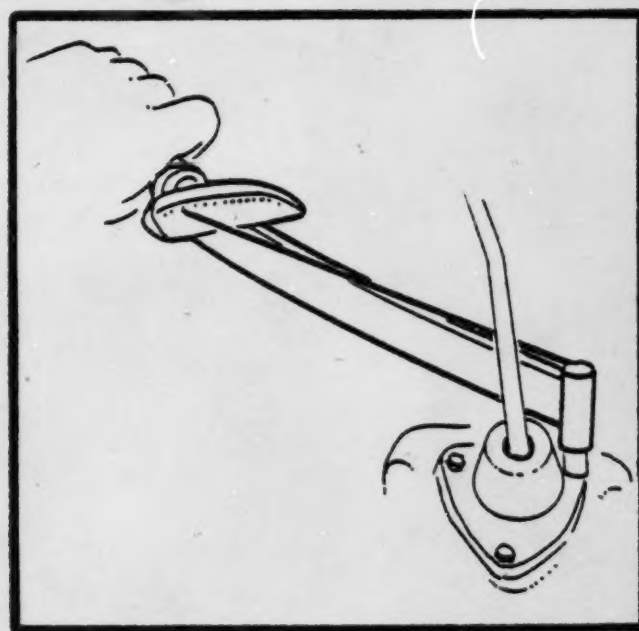


JOB STEPS

READ:

LOOK:

12. TORQUE THE SHIFT LEVER  
CAP SCREWS TO 80 - 108 IN/LBS.



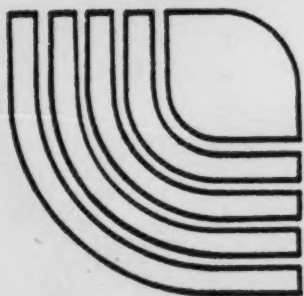
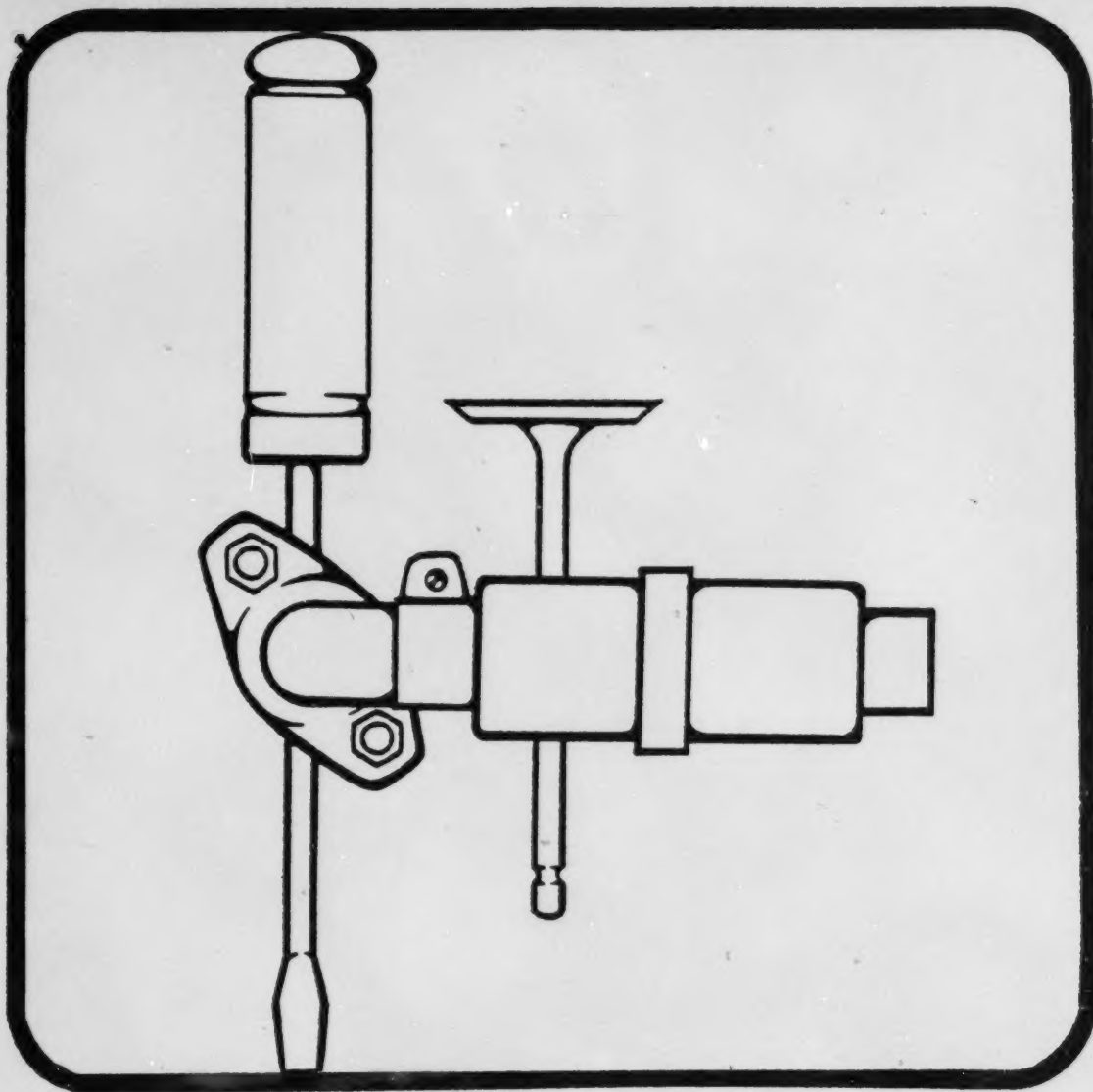
13. ASK YOUR INSTRUCTOR TO HELP  
YOU CHECK THE CLUTCH AND BRAKE  
ADJUSTMENTS.

14. CLEAN UP YOUR WORK AREA.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REPLACED THE BELT ON THE ENGINE DRIVE PULLEY AND THE CLUTCH IDLER PULLEY.
2. PUT THE IDLER PULLEY BELT BACK IN PROPERLY.
3. PUT THE SHIFT LEVER BACK IN PROPERLY.
4. TORQUED THE SHIFT LEVER CAP SCREWS TO 80 - 108 IN/LBS.
5. HAD THE INSTRUCTOR CHECK THE CLUTCH AND BRAKE ADJUSTMENTS.
6. CLEANED UP YOUR WORK AREA.



## small engine repair

unit: GEAR BOXES AND DRIVE TRAINS

capital area career center

module: 7501 10 003 1 7501 10 003 3 date: OCTOBER 1977 level:       

skill title: REMOVE AND REPLACE GEAR BOX ON JACOBSON RIDING  
MOWER (MODEL 42635)

developed & written by: A. STEINBERG

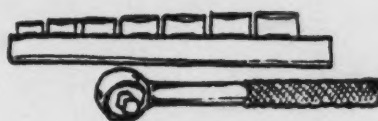
visuals by: DAVE WEHRWEIN

PERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

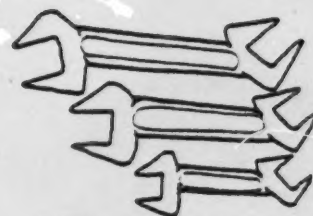
HOW TO REMOVE AND REPLACE THE GEAR BOX (TRANSMISSION) ON  
A JACOBSON RIDING MOWER (MODEL 42635).

AND IN ORDER TO DO THIS YOU WILL NEED:

JACOBSON RIDING MOWER



SOCKET SET



OPEN-END WRENCH SET



SET OF HEX KEYS



SAFETY GLASSES

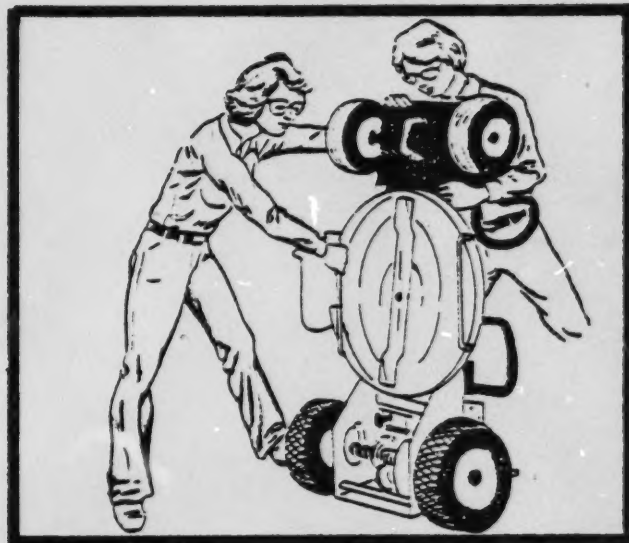
WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE ALL YOUR EQUIPMENT.
2. THE REPLACED GEAR BOX WORKS WELL THROUGH ALL THE SHIFTS (FORWARD, REVERSE, AND NEUTRAL).

"TURN THE PAGE"

JOB STEPSREAD:

1. GET ALL EQUIPMENT AND TAKE IT TO YOUR WORK AREA.

LOOK:

2. STAND MOWER UP AND DOWN AS SHOWN BY YOUR INSTRUCTOR.

\*\*\*\*\*  
CAUTION: DO NOT START WORK ON THE MOWER  
UNTIL YOUR INSTRUCTOR HAS CHECKED  
FOR SAFETY. WEAR YOUR SAFETY  
GLASSES.  
\*\*\*\*\*

3. UNSCREW THE THREADED BALL KNOB OF THE SHIFT LEVER BY HAND AND REMOVE ENGINE BOX PANELS (BOTH RIGHT AND LEFT SIDES).



"TURN THE PAGE"



WORD GUIDE

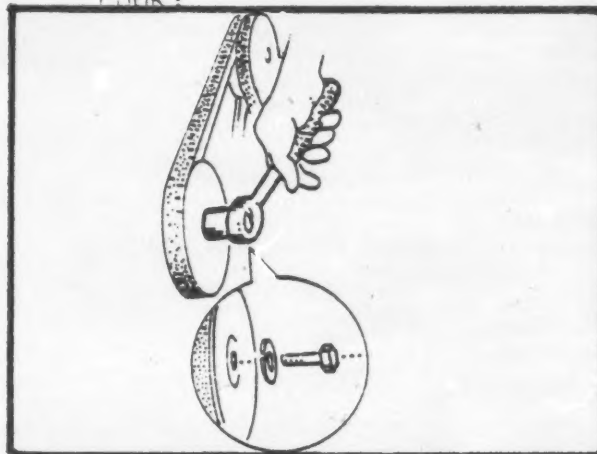
WORN - DAMAGED, MUCH USED, OLD

SLACK - LOOSENING

JOB STEPSREAD:

4. USING THE SOCKET WRENCH, REMOVE THE HEX NUT AND LOCKWASHER HOLDING THE TRANSMISSION PULLEY IN PLACE. THEN REMOVE PULLEY FROM TRANSMISSION SHAFT. →

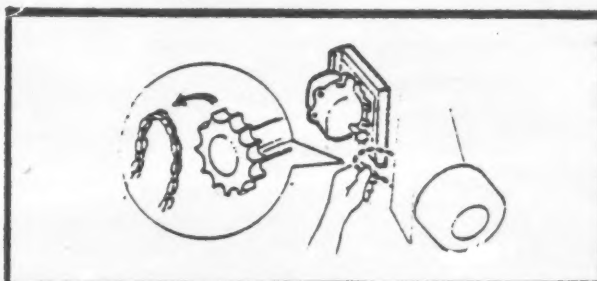
NOTE: DO NOT REMOVE TRANSMISSION BELT, UNLESS IT IS WORN.

LOOK:

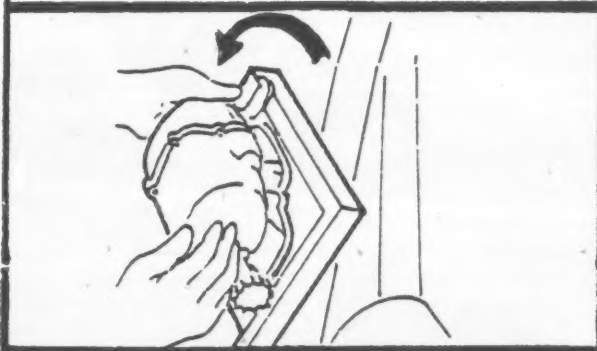
CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL YOUR EQUIPMENT.
2. STOOD THE MOWER UP AND DOWN.
3. REMOVED THE BALL KNOB, ENGINE BOX PANELS, HEX NUT, LOCKWASHER AND TRANSMISSION PULLEY.

5. REMOVE 4 NUTS HOLDING THE TRANSMISSION TO THE FRAME AND SLIDE THE UNIT TO THE REAR OF THE MOWER TO GET ENOUGH SLACK TO REMOVE THE DRIVE CHAIN. →

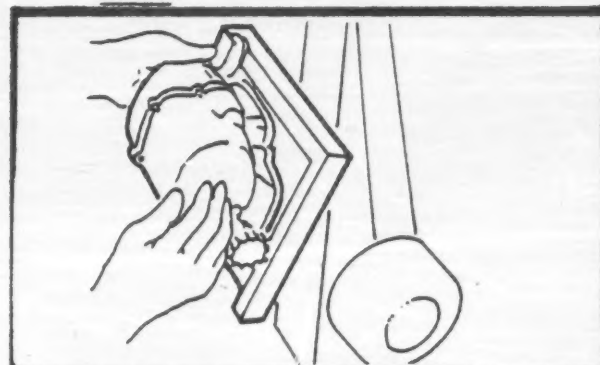


6. REMOVE THE GEAR BOX. →

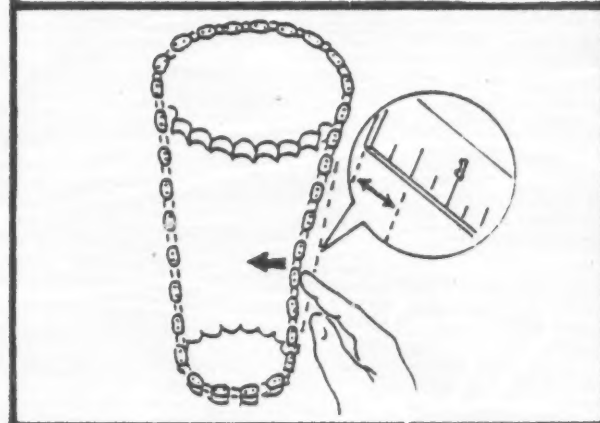


WORD GUIDEMOUNT - PUT ON TOPGIVE - LOOSENESS; SLACKTENSION - STIFFNESSJOB STEPSREAD:

7. TO RE-BUILD THE UNIT, FIRST REPLACE THE GEAR BOX ON ITS MOUNTING BOLTS.



8. REPLACE THE CHAIN AND MAKE THE BOLTS TIGHT. THE CHAIN SHOULD HAVE NO MORE THAN 1/2" GIVE WHEN YOU PRESS YOUR FINGER IN THE MIDDLE.

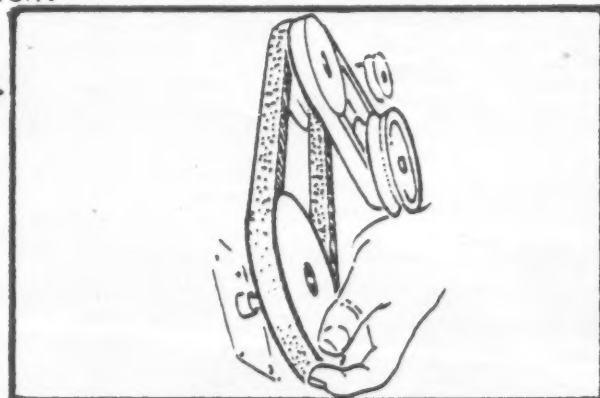


NOTE: YOU MAY HAVE TO SET THE CHAIN TENSION BY MOVING THE TRANSMISSION MOUNTING PLATE. THE ADJUSTING BOLT IS UNDER THE FRAME, ABOVE THE CUTTING DECK, ON THE RIGHT SIDE OF THE MOWER.

CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED THE DRIVE TRAIN AND GEAR BOX.
2. RE-BUILT THE UNIT.
3. REPLACED THE CHAIN AND MADE THE BOLTS TIGHT.
4. SET THE CHAIN TENSION.

9. REPLACE THE BELT ON THE TRANSMISSION PULLEY AND MOUNT THE PULLEY ON THE TRANSMISSION SHAFT. MAKE THE HEX NUT TIGHT.



JOB STEPS

READ:

10. REPLACE THE ENGINE BOX  
PANELS AND THE SHIFT LEVER  
BALL.

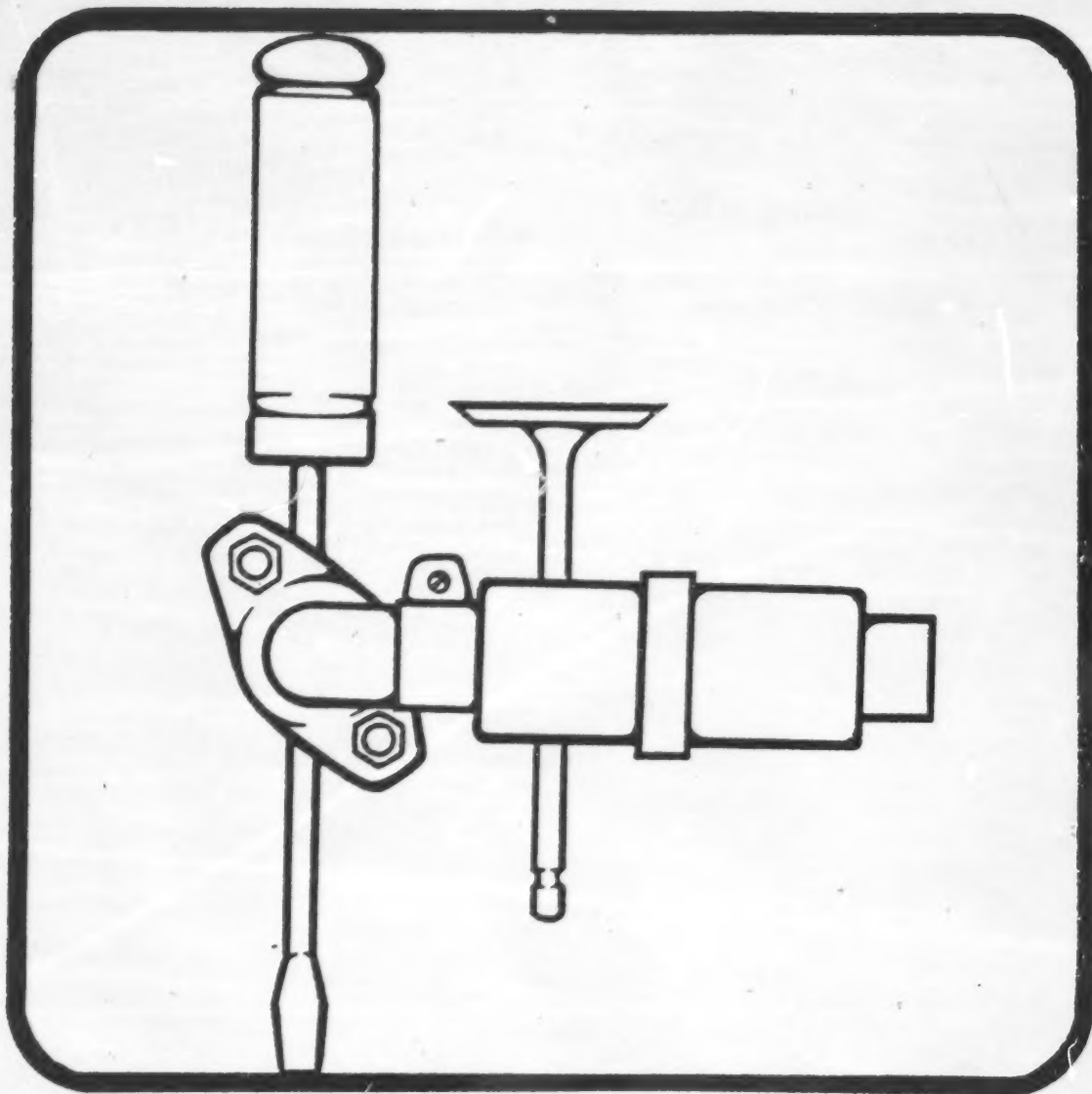
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REPLACED THE TRANSMISSION PULLEY BELT AND MOUNTED THE PULLEY ON THE SHAFT.
2. REPLACED THE BOX PANELS AND SHIFT LEVER BALL.

11. HAVE YOUR INSTRUCTOR WATCH  
YOU AS YOU LOWER THE MOWER AND  
TEST THE TRANSMISSION.



## small engine repair

unit: GEAR BOXES AND DRIVE TRAINS

capital area career center

module: 7501 10 004 1  
7501 10 004 3 date: OCTOBER 1977 level:       

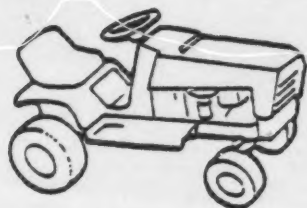
skill title: ADJUST VARIATOR AND BRAKE LINKAGE ON JOHN DEERE -  
200 SERIES

developed & written by: A. STEINBERG

visuals by: STEVE BRAMER

WORD GUIDEGUIDELINES - RULESPERFORMANCE OBJECTIVEYOU ARE GOING TO LEARN:

HOW TO SET THE VARIATOR LINKAGE AND BRAKE LINKAGE ON A JOHN DEERE TRACTOR (200 SERIES).

AND IN ORDER TO DO THIS YOU WILL NEED:

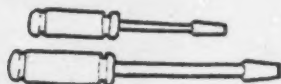
JOHN DEERE TRACTOR  
(200 SERIES)



SOCKET SET



PLIERS



SCREWDRIVER



SAFETY GLASSES

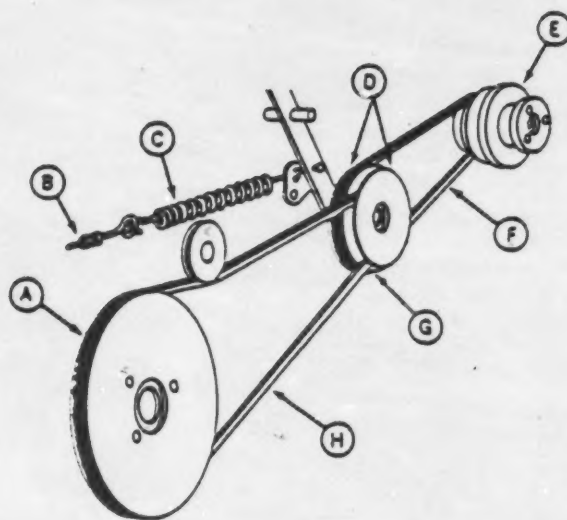
WE WILL KNOW YOU CAN DO IT WHEN:

1. YOU HAVE ALL THE EQUIPMENT.
2. YOU HAVE SET THE LINKAGES:
  - A. THE SPEED CONTROL & CLUTCH WORK TO THE MANUAL'S GUIDELINES.
  - B. PRESSURE ON BRAKE PEDAL IS ENOUGH TO STOP THE MACHINE.



INFORMATION

STUDY THE DRAWING BELOW. GO BACK TO LOOK AT IT WHEN DOING THE JOB STEPS. IT SHOWS YOU ALL THE PARTS OF A VARIATOR LINKAGE.



M16646N

A—Driven Sheave  
B—Eyebolt  
C—Spring  
D—Half Sheave

E—Drive Sheave  
F—Primary Belt  
G—Center Sheave  
H—Secondary Belt

WORD GUIDE

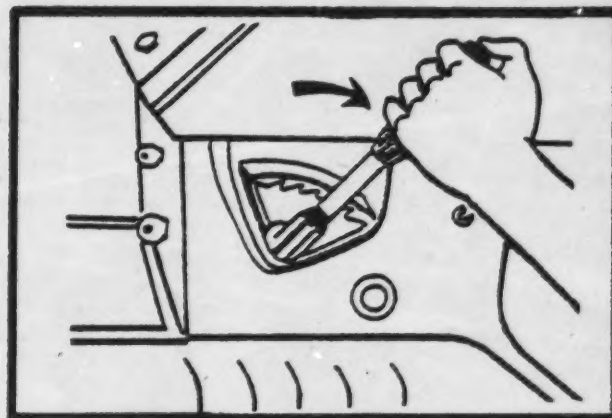
VARIABLE - CHANGEABLE

PRY - BEND UP, PULL APART.JOB STEPS

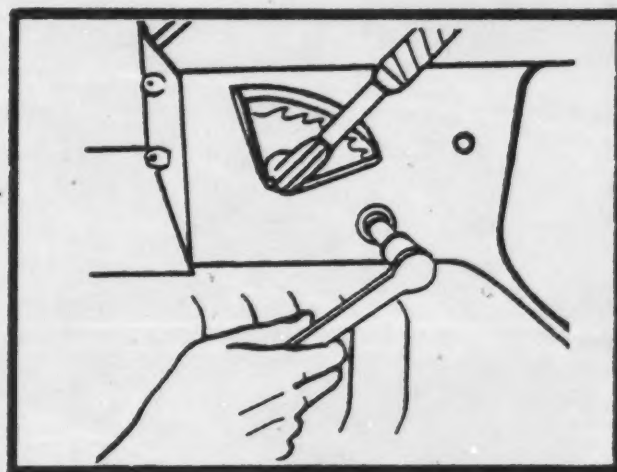
1. GET ALL EQUIPMENT AND TAKE IT TO YOUR WORK AREA.



2. TO START TO SET THE VARIATOR LINKAGE, PLACE VARIABLE SPEED CONTROL ON NOTCH 5 ON THE QUADRANT (3RD NOTCH FROM FRONT OF TRACTOR).



3. PULL UP BOTTOM FROM ADJUSTING HOLE BELOW VARIABLE SPEED CONTROL. USE 3/4" SOCKET WRENCH TO LOOSEN CAP-SCREWS ONE OR TWO TURNS.



NOTE: WEAR YOUR SAFETY GLASSES.

"TURN THE PAGE"

WORD GUIDE

DISCONNECT - TAKE APART, SEPARATE.

REVOLUTIONS - FULL TURNS.

SLACK - LOOSENINGJOB STEPS

READ:

4. DISCONNECT SPARK PLUG CABLE  
AND GROUND.

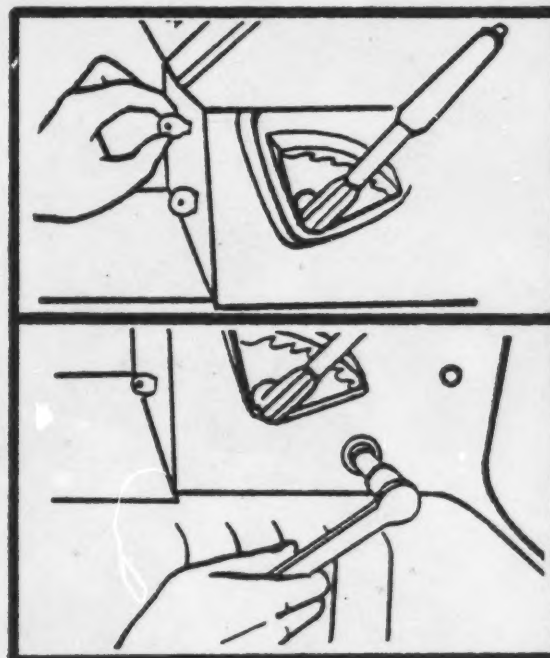
LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. ALL EQUIPMENT.
2. PLACED VARIABLE SPEED CONTROL ON NOTCH 5 ON QUADRANT.
3. PULLED APART THE BOTTOM FROM THE ADJUSTING HOLE BELOW VARIABLE SPEED CONTROL AND LOOSENED CAP SCREW 1 OR 2 TURNS.
4. DISCONNECTED SPARK PLUG CABLE AND GROUND.

5. TO CRANK ENGINE MANY TURNS  
WITH THE STARTER, TURN IGNITION  
KEY. CRANK UNTIL CLUTCH PEDAL  
RAISES AS HIGH AS IT WILL GO.



6. TAKE UP SLACK IN LINKAGE BY  
PUSHING DOWN ON CAP SCREW.





WORD GUIDE  
CLEVIS - U-SHAPED END.

JOB STEPS

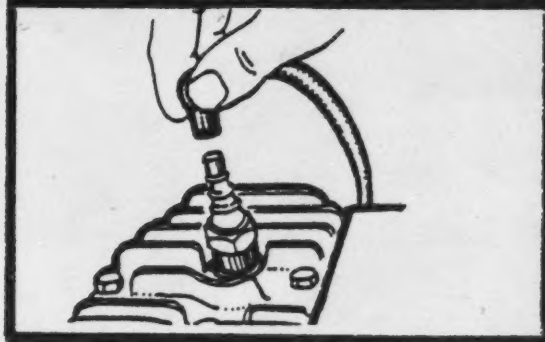
READ:

7. MAKE THE CAPSCREW TIGHT AND REPLACE THE BUTTON PLUG IN ADJUSTING HOLE.

LOOK:



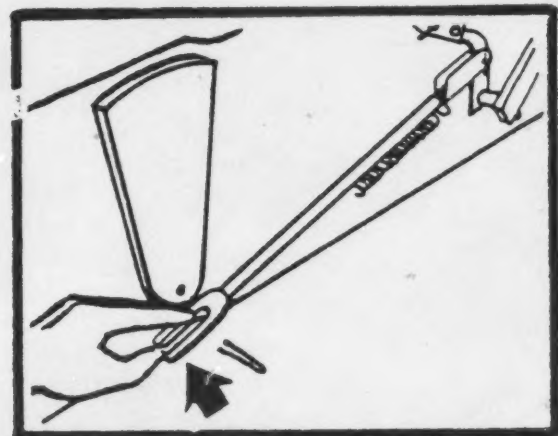
8. RE-CONNECT SPARK PLUGS AND GROUND.



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. CRANKED ENGINE MANY TURNS WITH THE STARTER UNTIL THE CLUTCH PEDAL IS AS HIGH AS IT CAN GO.
2. TAKEN UP LINKAGE SLACK.
3. MADE THE CAP SCREW TIGHT AND REPLACED THE BUTTON PLUG IN THE ADJUSTING HOLE.
4. RE-CONNECTED THE SPARK PLUGS AND GROUND.

9. TO SET THE BRAKES, REMOVE COTTER PIN AND DRILLED PIN. THEN, TURN CLEVIS ON BRAKE ROD UNTIL THE BRAKE IS IN FIRST NOTCH OF PARK LOCK.

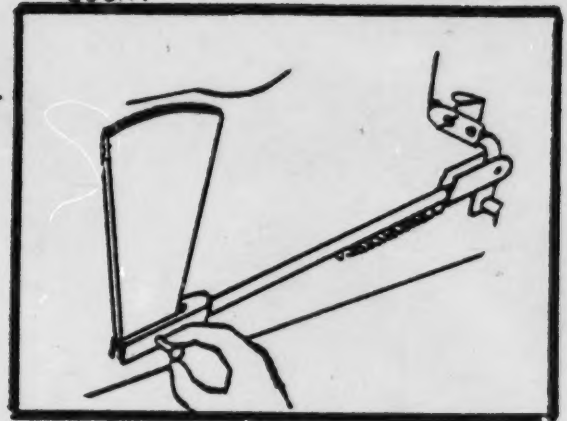


JOB STEPS

READ:

10. REPLACE THE DRILLED PIN  
AND THE COTTER PIN.

LOOK:



CHECK: ASK YOUR INSTRUCTOR TO CHECK THAT YOU HAVE:

1. REMOVED COTTER PIN, DRILLED PIN AND TURNED CLEVIS ON BRAKE ROD UNTIL THE BRAKE WAS IN FIRST NOTCH OF PARK LOCK.
2. REPLACED THE DRILLED PIN AND THE COTTER PIN.